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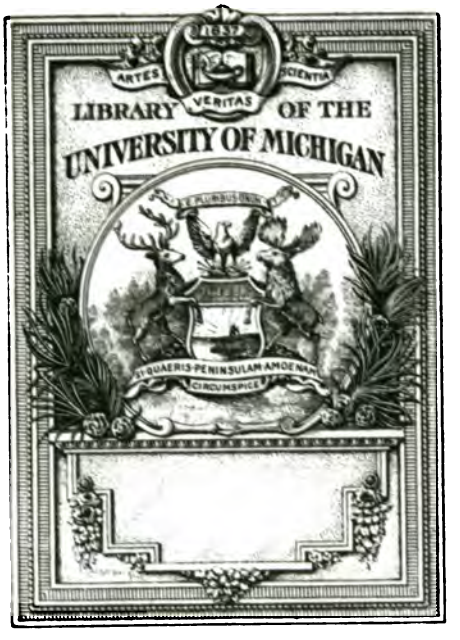
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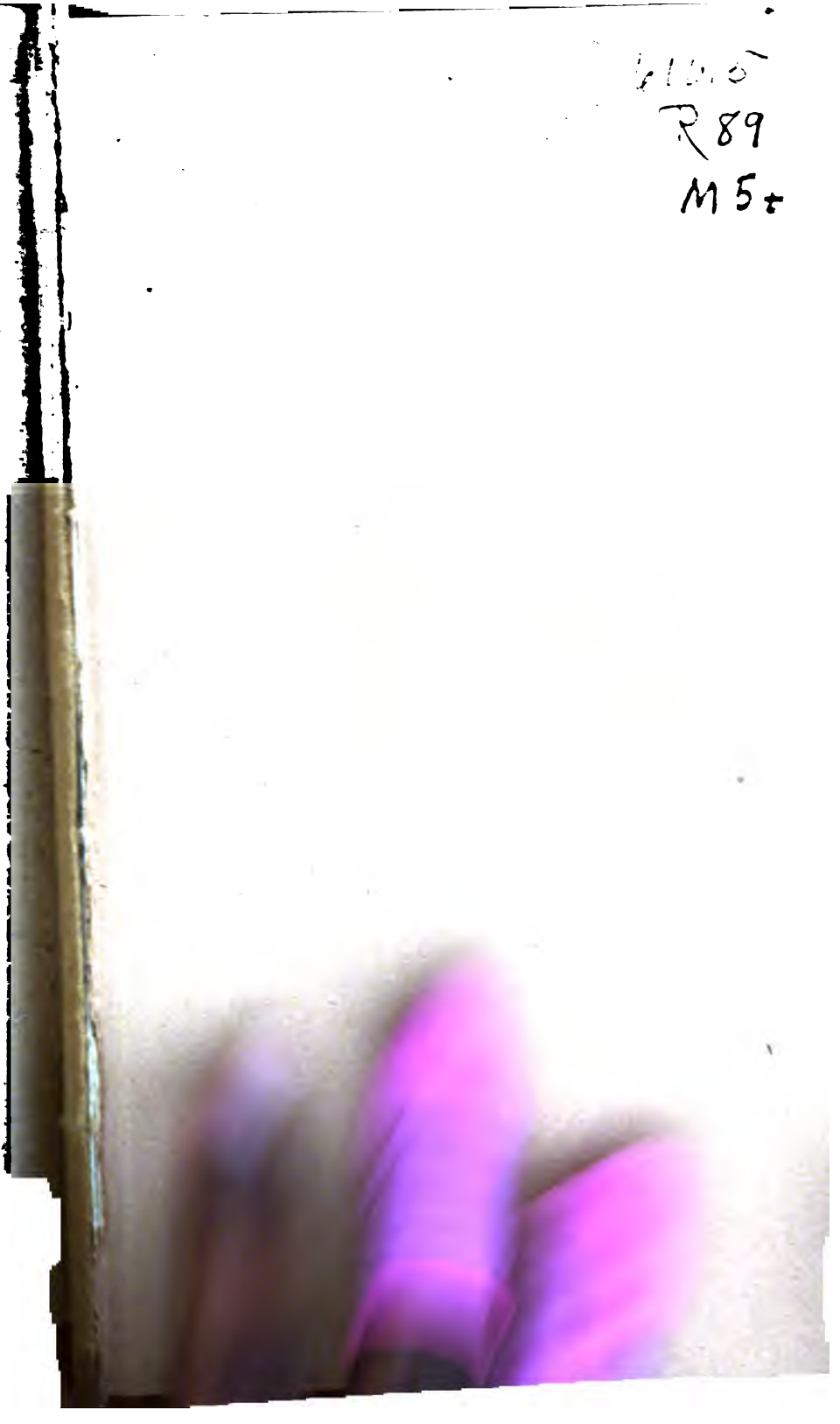

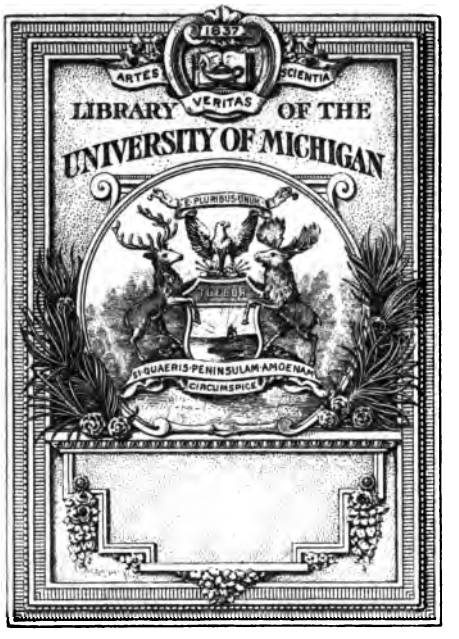
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VOLUME THE FORTY-FOURTH.

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PATERNOSTER ROW.

1861.

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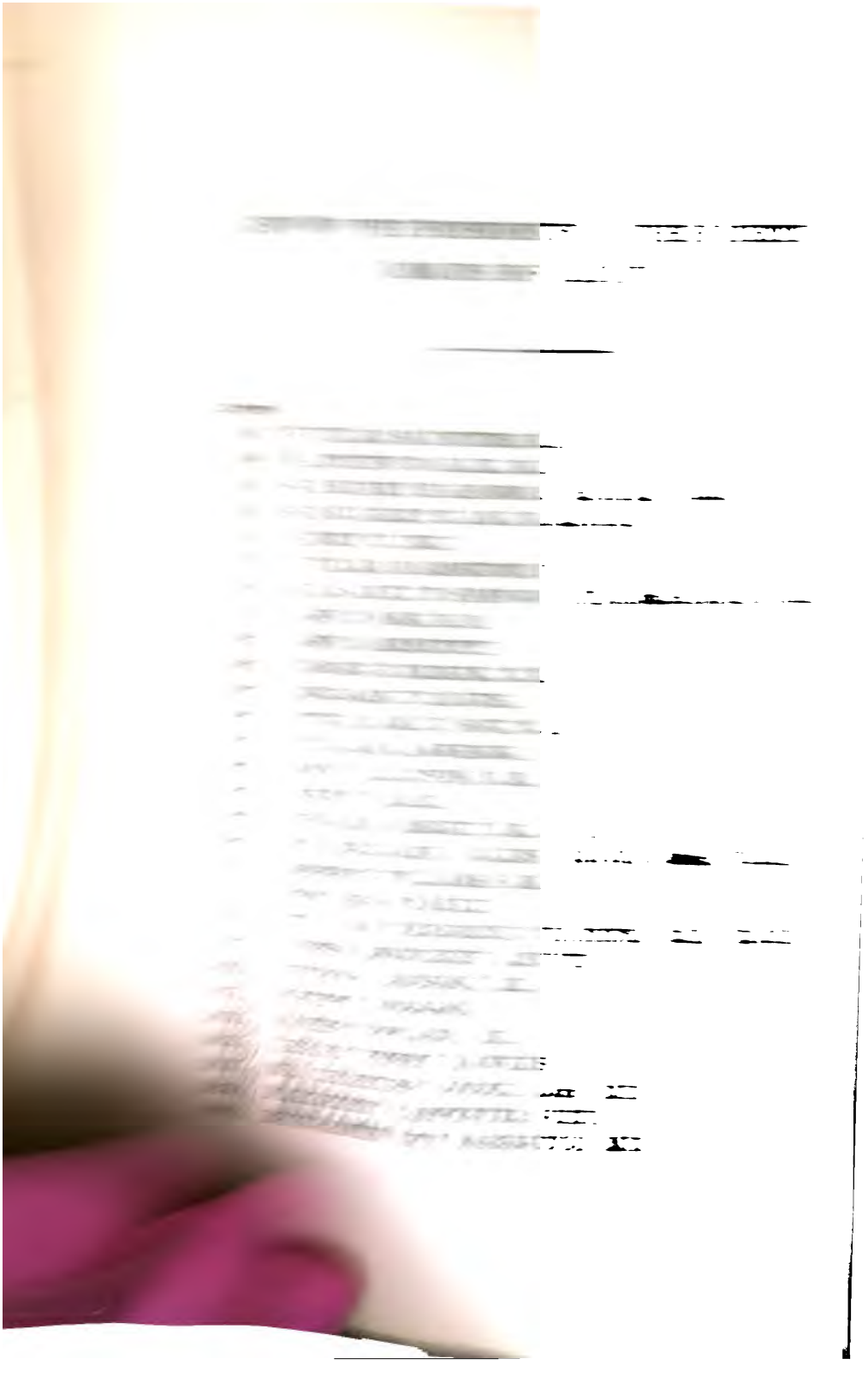

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OCTOBER 1861.

Those marked thus (†) have paid the Composition Fee in lieu of further annual subscriptions.

Amongst the non-residents, those marked thus (*) are entitled by composition to receive the Transactions.

Elected

1841 *James Abercrombie, M.D., Cape of Good Hope.

1846 *John Abercrombie, M.D., Physician to the Cheltenham General Hospital, 13, Suffolk square, Cheltenham.

1851 *Henry Wentworth Acland, M.D., F.R.S., Physician to the Radcliffe Infirmary; Regius Professor of Medicine, and Clinical Professor in the University of Oxford.

1847 Elias Acosta, M.D., New York, U.S.

1842 William Acton, 17, Queen Anne street, Cavendish square. *Trans.* 1.

Elected

1851 JOHN ADAMS, Surgeon to, and Lecturer on Descriptive and Surgical Anatomy at, the London Hospital; 4, St. Helen's place, Bishopsgate street. *Trans.* 3.

1852 WILLIAM ADAMS, Surgeon to the Royal Orthopædic Hospital; Lecturer on Anatomy and Surgery at the Grosvenor place School of Anatomy and Medicine; 5, Henrietta street, Cavendish square. *Trans.* 2.

1837 *RALPH FAWSETT AINSWORTH, M.D., Physician to the Manchester Royal Infirmary; Cliff Point, Lower Broughton, Manchester.

1819 GEORGE FREDERICK ALBERT.

1839 RUTHERFORD ALCOCK, K.C.T., K.T.S., H.M.'s Envoy Extraordinary and Consul-General in Japan. *Trans.* 1.

1826 JAMES ALDERSON, M.D., F.R.S., Senior Physician to, and Lecturer on Clinical Medicine at, St. Mary's Hospital; 17, Berkeley square. S. 1829. C. 1848. T. 1849. V.P. 1852-3. *Trans.* 3.

1843 CHARLES JAMES BERRIDGE ALDIS, M.D., Medical Officer of Health for St. George's, Hanover square; Senior Physician to the Surrey Dispensary; and Physician to the St. Paul and St. Barnabas Dispensary; 1, Chester terrace, Chester square.

1850 CHARLES REVANS ALEXANDER, Surgeon to the Royal Infirmary for Diseases of the Eye; 6, Cork street, Bond street.

1836 HENRY ANCELL, 3, Norfolk crescent, Oxford square. C. 1847-8. *Trans.* 2.

1820 THOMAS ANDREWS, M.D., Norfolk, Virginia.

1819 PROFESSOR ANTOMMARCHI, Florence.

1819 †JAMES MONCRIEFF ARNOTT, F.R.S., Surgeon in Ordinary to H.R.H. the Prince Consort; 2, New Burlington street. L. 1826-8. V.P. 1832-3. T. 1835-40. C. 1846, 1855-6. P. 1847-8. *Trans.* 8.

1817 †JOHN ASHBURNER, M.D., F.L.S., 7, Hyde Park place, Cumberland gate. C. 1821, 1830-1.

1851 THOMAS JOHN ASHTON, 31, Cavendish square.

Elected

1825 †Benjamin Guy Babington, M.D., F.R.S., *President*, Physician to the Asylum for Deaf and Dumb; Consulting Physician to the German Hospital, and to the City of London Hospital for Diseases of the Chest; 31, George street, Hanover square. C. 1829. V.P. 1845-6. T. 1848. *Trans.* 2.

1846 Cornelius Metcalfe Stuart Babington, F.R.C.P., Physician to Queen Charlotte's Lying-in Hospital, and Assistant-Physician to the Hospital for Sick Children; 29, Hertford street, May fair. C. 1859-60.

1838 Francis Badgley, M.D., Holyrood House, Great Malvern.

1820 *John Badley, Dudley, Worcestershire.

1840 William Bainbridge, late of Kingston, Surrey.

1836 Andrew Wood Baird, M.D., Physician to the Dover Hospital; Dover, Kent.

1851 *Alfred Baker, Surgeon to the Birmingham General Hospital, and Lecturer on Surgery at Sydenham College; Cannon street, Birmingham.

1839 †Thomas Graham Balfour, M.D., F.R.S., *Vice-President*, Deputy Inspector-General of Hospitals; 10, Sumner place, Onslow square, Brompton. C. 1852-3. V.P. 1860-1. *Trans.* 2.

1848 Edward Ballard, M.D., Medical Officer of Health for Islington; 7, Compton terrace, Upper street, Islington. *Trans.* 1.

1849 Thomas Ballard, 10, Southwick place, Hyde park.

1847 Andrew Whyte Barclay, M.D., *Librarian*, Assistant-Physician to, and Lecturer on Materia Medica at, St. George's Hospital; Medical Officer of Health for Chelsea; 23A, Bruton street, Berkeley square. S. 1857-60. L. 1861. *Trans.* 2.

1848 Edgar Barker, 9, Oxford square, Hyde park.

1833 †Thomas Alfred Barker, M.D., *Treasurer*, Senior Physician to, and Lecturer on Clinical Medicine at, St. Thomas's Hospital; 71, Grosvenor street. C. 1844-5. V.P. 1853-4. T. 1860-1. *Trans.* 6.

1843 Thomas Herbert Barker, M.D., Harpur place, Bedford.

Elected

1847 GEORGE HILARO BARLOW, M.D., Physician to, and Lecturer on Clinical Medicine at, Guy's Hospital; Physician to the Magdalen Hospital; 5, Union street, Southwark. C. 1859.

1840 BENJAMIN BARROW, Surgeon to the Royal Isle of Wight Infirmary; Clifton House, Ryde, Isle of Wight.

1859 RICHARD BARWELL, Assistant-Surgeon to, and Lecturer on Comparative Anatomy at, the Charing Cross Hospital; 22, Old Burlington street.

1844 WILLIAM RICHARD BASHAM, M.D., Senior Physician to, and Lecturer on Medicine at, the Westminster Hospital; 17, Chester street, Grosvenor place. S. 1852-4. C. 1860-1. *Trans.* 2.

1860 ADAM BEALEY, M.D., M.A. Camb., Physician to the Royal General Dispensary, St. Pancras; 27, Tavistock square.

1841 GEORGE BEAMAN, M.D., 5, Lancaster place, Strand.

1856 AMOS BEARDSLEY, Ulverstone, Lancashire.

1836 WILLIAM BEAUMONT, Professor of Surgery in the University of King's College, Toronto, Upper Canada. *Trans.* 2.

1840 CHARLES BEEVOR, 41, Upper Harley street.

1858 WILLIAM CHAPMAN BEGLEY, M.D., Middlesex County Lunatic Asylum; Hanwell.

1819 †THOMAS BELL, F.R.S., F.L.S., Professor of Zoology in King's College, London; Surgeon-Dentist to, and Lecturer on the Anatomy and Diseases of the Teeth at, Guy's Hospital; President of the Linnean Society; 17, New Broad street, City. C. 1832-3. V.P. 1854. *Trans.* 1.

1847 JAMES HENRY BENNET, M.D., Physician-Accoucheur to the Royal Free Hospital; The Ferns, Weybridge.

1845 EDWARD UNWIN BERRY, 7, James street, Covent garden.

1820 STEPHEN BERTIN, Paris.

1815 †ARCHIBALD BILLING, M.D., F.R.S., late Senior Physician to the London Hospital; Member of the Senate of the University of London; 6, Grosvenor Gate. C. 1825. V.P. 1828-9.

1827 WILLIAM BIRCH, Barton-under-Needwood, Staffordshire. *Trans.* 2.

Elected

1850 JAMES BIRD, M.D., Lecturer on Military Surgery at St. Mary's Hospital Medical School; 27, Hyde park square.

1855 PETER HINCKES BIRD, F.L.S., 1, Norfolk square, Hyde park.

1856 WILLIAM BIRD, Surgeon to the West of London Hospital, and the St. George's and St. James's Dispensary; 11, George street, Hanover square.

1849 EDMUND LLOYD BIRKETT, M.D., Physician to the City of London Hospital for Diseases of the Chest; 48, Russell square.

1851 GEORGE BIRKETT, M.D., Lecturer on Medical Jurisprudence at the Charing Cross Hospital; Northumberland House, Green lanes, Stoke Newington.

1851 JOHN BIRKETT, F.L.S., Surgeon to, and Lecturer on Surgery at, Guy's Hospital; 59, Green street, Grosvenor square. L. 1856-7. *Trans.* 4.

1846 HUGH BIET, British Naval Hospital, Valparaiso.

1843 PATRICK BLACK, M.D., Physician to, and Lecturer on Medicine at, St. Bartholomew's Hospital; 11, Queen Anne street, Cavendish square. C. 1856.

1847 GEORGE C. BLACKMAN, M.D., Professor of Surgery in the Medical College of Ohio; New York, U.S.

1840 PEYTON BLAKISTON, M.D., F.R.S., St. Leonard's-on-Sea.

1845 HENRY BLENKINSOP, Senior Surgeon to the Warwick Dispensary; Jury street, Warwick.

1823 LOUIS HENRY BOJANUS, M.D., Wilna.

1846 PETER BOSSEY, 4, Broadwater road, Worthing, Sussex.

1846 JOHN ASHTON BOSTOCK, Hon. Surgeon to H.M. the Queen; Surgeon-Major, Scots Fusilier Guards; 54, Chester square, Belgravia. C. 1861.

1841 WILLIAM BOWMAN, F.R.S., Surgeon to King's College Hospital, and to the Royal London Ophthalmic Hospital, Moorfields; 5, Clifford street, Bond street. C. 1852-3. *Trans.* 3.

1857 WILLIAM BRINTON, M.D., Physician to, and Lecturer on Physiology at, St. Thomas's Hospital; 20, Brook street, Grosvenor square.

Elected

1851 BERNARD EDWARD BRODHURST, Assistant-Surgeon to the Royal Orthopædic Hospital, and Senior Surgeon to the Hon. Artillery Company; 20, Grosvenor street. *Trans.* 2; *Pro.* 1.

1813 †SIR BENJAMIN COLLINS BRODIE, Bart., D.C.L., F.R.S., Serjeant-Surgeon to H.M. the Queen, Surgeon in Ordinary to H.R.H. the Prince Consort, Foreign Correspondent of the Institute of France, and Foreign Associate of the Imperial Academy of Medicine of Paris; Broome park, Betchworth, Surrey. C. 1814-15, 1818-19, 1821-2, 1835-6, 1841-2, 1849. V.P. 1816-17. P. 1839-40. *Trans.* 12.

1844 CHARLES BROOKE, M.A., F.R.S., Surgeon to, and Lecturer on Surgery at, the Westminster Hospital; 16, Fitzroy square. C. 1855.

1848 WILLIAM PHILPOT BROOKES, M.D.

1854 *HENRY BROWN, Surgeon to H.M. the Queen, H.R.H. the Prince Consort, and the Royal Household; Windsor.

1857 *ROBERT BROWN, Surgeon to the Carlisle Dispensary; 4, Devonshire street, Carlisle.

1860 CHARLES EDOUARD BROWN-SÉQUARD, M.D., F.R.S., Physician to the National Hospital for the Paralysed and Epileptic; 25, Cavendish square.

1851 ALEXANDER BROWNE, M.D., Twynholm, Kirkcudbright.

1860 THOMAS BRYANT, Assistant-Surgeon to, and Lecturer on Operative Surgery at, Guy's Hospital; 2, Finsbury square. *Trans.* 2; *Pro.* 1.

1855 WALTER JOHN BRYANT, L.R.C.P. Edinb., 7, Bathurst street, Hyde park gardens.

1823 B. BARTLET BUCHANAN, M.D.

1843 JOHN CHARLES BUCKNILL, M.D., Medical Superintendent of the Devon County Lunatic Asylum, Exminster, Devonshire.

1839 GEORGE BUDD, M.D., F.R.S., Professor of Medicine in King's College, London; Physician to King's College Hospital; Consulting Physician to the Seamen's Hospital Ship 'Dreadnought;' 20, Dover street, Piccadilly. C. 1846-7. V.P. 1857. *Trans.* 5.

Elected

1839 THOMAS HENRY BURGESS, M.D., Portsmouth.

1853 PATRICK BURKE, 13, Upper Montagu street, Montagu square.

1854 PHILIP BURROWES, Surgeon to the London City Mission, and Assistant-Surgeon to the Hospital for Women; 23, Gloucester crescent north, Hyde park.

1833 †GEORGE BURROWS, M.D., F.R.S., Physician to St. Bartholomew's Hospital; 18, Cavendish square. C. 1839-40, 1858-9. T. 1845-7. V.P., 1849-50. *Trans.* 2.

1820 SAMUEL BURROWS.

1837 GEORGE BUSK, F.R.S., F.L.S., Examiner in Comparative Anatomy at the University of London; Surgeon to the Seamen's Hospital Ship 'Dreadnought;' 15, Harley street, Cavendish square. C. 1847-8. V.P. 1855. *Trans.* 4.

1818 JOHN BUTTER, M.D., F.R.S., F.L.S., Physician Extraordinary to the Plymouth Royal Eye Infirmary; Plymouth.

1851 *WILLIAM CADGE, Surgeon to the Norfolk and Norwich Hospital; All Saints, Norwich. *Trans.* 1.

1851 THOMAS CALLAWAY, India.

1861 GEORGE WILLIAM CALLENDER, Assistant-Surgeon to, and Demonstrator of Anatomy at, St. Bartholomew's Hospital, and Surgeon to the North London Eye Infirmary; 47, Queen Anne street, Cavendish square.

1852 *GEORGE CANNEY, Bishop-Auckland, Darlington, Durham.

1847 JOHN BURFORD CARLILL, M.D., Surgeon-Accoucheur to the Newman street Lying-in Institution; 57, Berners street.

1825 HARRY W. CARTER, M.D., F.R.S.E., Consulting Physician to the Kent and Canterbury Hospital; Kennington Hall, Ashford, Kent.

1853 ROBERT BRUDENELL CARTER, Newthorpe, Nottinghamshire.

1820 †SAMUEL CARTWRIGHT, F.R.S., F.L.S., Nizell's House, near London, and Tunbridge, Kent.

1845 SAMUEL CARTWRIGHT, Jun., Professor of Dental Surgery at King's College, London; Surgeon-Dentist to King's College Hospital; 32, Old Burlington street. C. 1860-1.

1839 WILLIAM CATHROW, 42, Weymouth street, Portland place. C. 1860-1.

Elected

1845 WILLIAM OLIVER CHALK, Surgeon to the St. Marylebone Eye and Ear Institution; 3, Nottingham terrace, York gate, Regent's park.

1844 THOMAS KING CHAMBERS, M.D., Physician to, and Lecturer on Medicine at, St. Mary's Hospital; Physician to the Lock Hospital; 22B, Brook street, Grosvenor square. *Trans.* 1. C. 1861.

1859 FRANK CHANCE, M.B., 51, Wimpole street, Cavendish square.

1849 FREDERICK CHAPMAN, Richmond green, Surrey.

1837 HENRY THOMAS CHAPMAN, 16, Lower Seymour street, Portman square. C. 1858.

1852 GEORGE BORLASE CHILDS, Surgeon-in-Chief to the City Police Force, and Surgeon to the Metropolitan Free Hospital; 11, Finsbury place South.

1842 WILLIAM DINGLE CHOWNE, M.D., Physician to, and Lecturer on Medicine and Midwifery at, the Charing Cross Hospital; Corresponding Fellow of the Royal Academy of Surgery of Madrid; 8, Connaught place West, Hyde park. C. 1853-4.

1860 ANDREW CLARK, M.D., Assistant-Physician to, and Lecturer on Physiology at, the London Hospital; 23, Montague place, Russell square.

1839 FREDERICK LE GROS CLARK, Surgeon to, and Lecturer on Surgery at, St. Thomas's Hospital; Surgeon to the Magdalen Hospital; Consulting Surgeon to the Western General Dispensary, and to the London Female Penitentiary, Pentonville; 14, St. Thomas's street, Southwark, and Lee, Kent. S. 1847-9. V.P. 1855-6. *Trans.* 3.

1848 JOHN CLARKE, M.D., Physician to the British Lying-in Hospital, and Assistant-Physician to the General Lying-in Hospital; 42, Hertford street, May fair.

1861 *WILLIAM JAMES CLARKE, Surgeon to the Huddersfield Infirmary; John William street, Huddersfield, Yorkshire.

1850 JOSIAH CLARKSON, New Hall street, Birmingham. *Trans.* 1.

Elected

1842 Oscar Moore Passey Clayton, 87, Harley street.

1853 Joseph Thomas Clover, 3, Cavendish place, Cavendish square.

1857 Charles Coates, F.R.C.P., Edinb., Physician to the Bath United General Hospital; 10, Circus, Bath.

1851 Edward Cock, Senior Surgeon to, and Lecturer on Clinical Surgery at, Guy's Hospital; Consulting Surgeon to the Asylum for Deaf and Dumb; 13, St. Thomas's street, Southwark. C. 1857. *Trans.* 3.

1850 Daniel Whitaker Cohen, M.D.

1835 *William Colborne, Chippenham, Wiltshire.

1818 Robert Cole, F.L.S., Holybourne, Hampshire.

1855 Frederick Collins, M.D., Medical Officer of Health for Wanstead; Wanstead, Essex.

1828 John Conolly, M.D., D.C.L., Consulting Physician to the Middlesex County Lunatic Asylum, Hanwell.

1840 *William Robert Cooke, Burford, Oxfordshire.

1819 George Cooper, Brentford, Middlesex.

1841 George Lewis Cooper, one of the Surgeons to the National Vaccine Institution, and Teacher of Vaccination to the Medical School of University College; Surgeon to the Bloomsbury Dispensary; 7, Woburn place, Russell square. C. 1860-1.

1843 William White Cooper, Surgeon-Oculist in Ordinary to H.M. the Queen; Senior Surgeon to the North London Eye Infirmary; and Ophthalmic Surgeon to, and Lecturer on Ophthalmic Surgery at, St. Mary's Hospital; 19, Berkeley square. C. 1858-9.

1841 Holmes Coote, Senior Assistant-Surgeon to, and Lecturer on Comparative Anatomy at, St. Bartholomew's Hospital, and Assistant-Surgeon to the Royal Orthopædic Hospital; 26, New Bridge street, Blackfriars. S. 1853-4. *Trans.* 1.

1835 George Ford Copeland, Cheltenham.

1822 †James Copland, M.D., F.R.S., Consulting Physician to the Royal Infirmary for Children, and to the Great Northern Hospital, King's Cross; Hon. Fellow of the Royal Academy of Sciences of Sweden, &c.; 5, Old Burlington street. C. 1831. V.P. 1838-9. P. 1853-4.

Elected

1847 JOHN ROSE CORMACK, M.D., F.R.S.E., 5, Bedford square.

1860 *THOMAS CHARLES STEUART CORRY, M.D., Surgeon to the Belfast General Dispensary: 1, Victoria street, Belfast.

1839 *CHARLES CÆSAR CORSELLIS, M.D., F.L.S., Benson, Oxon.

1853 WILLIAM GILLETT COBY, M.D., Middleton Lodge, Brighton.

1847 RICHARD PAYNE COTTON, M.D., Physician to the Hospital for Consumption and Diseases of the Chest; 46, Clarges street, Piccadilly.

1828 †WILLIAM COULSON, Senior Surgeon to St. Mary's Hospital; Consulting Surgeon to the German Hospital; 1, Chester terrace, Regent's park. C. 1831. L. 1832-7. V.P. 1851-2. *Trans.* 1.

1860 †JOHN COUPER, Assistant-Surgeon to the London Hospital; 33, Finsbury Circus.

1841 MERVYN ARCHDALL NOTT CRAWFORD, M.D., Wiesbaden. C. 1853-4.

1847 GEORGE CRITCHETT, Surgeon to the London Hospital, and Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 46, Finsbury square. *Trans.* 1.

1837 JOHN FARRAR CROOKES, Harewell, near Faversham, Kent.

1860 RICHARD CROSS, M.D., Surgeon to the Royal Northern Sea-Bathing Infirmary, Scarborough.

1849 *WILLIAM EDWARD CROWFOOT, Beccles, Suffolk.

1851 JAMES CAMERON CUMMING, M.D., 1, Cadogan place, Sloane street.

1846 HENRY CURLING, Surgeon to the Margate Royal Sea-Bathing Infirmary, and the Ramsgate Seamen's Infirmary; Ramsgate, Kent.

1837 THOMAS BLIZARD CURLING, F.R.S., Surgeon to, and Lecturer on Surgery at, the London Hospital; Examiner in Surgery at the University of London; 39, Grosvenor street. S. 1845-6. C. 1850. T. 1854-7. V.P. 1859. *Trans.* 13; *Pro.* 1.

1847 JOHN EDMUND CURREY, M.D., Lismore, County Waterford.

1836 GEORGE CURSHAM, M.D., Physician to the Hospital for Consumption and Diseases of the Chest, and to the Female Orphan Asylum; and Inspector of Anatomy for the Provinces; 55, Victoria street, Westminster. S. 1842-7. C. 1850-1. V.P. 1855. T. 1856-8. *Trans.* 1.

Elected

1822 CHRISTOPHER JOHN CUSACK, Chateau d'Eu, France.

1852 THOMAS CUTLER, M.D., Acting Physician at the Spa Waters; Spa, Belgium.

1828 ADOLPHE DALMAS, M.D., Paris.

1836 *JAMES STOCK DANIEL, Ramsgate, Kent.

1820 †GEORGE DARLING, M.D., 6, Russell square. C. 1841-2.

1848 HENRY DAUBENY.

1846 FREDERICK DAVIES, Surgeon to the Northern Dispensary; 19, Upper Gower street, Bedford square.

1818 †HENRY DAVIES, M.D., Consulting-Physician to the British Lying-in Hospital; 6, Duchess street, Portland place. C. 1827-8. V.P. 1848-9.

1847 JOHN DAVIES, M. D., Physician Extraordinary to the Hertford General Infirmary, and Visiting Physician to the Hadham Palace Lunatic Asylum, Hertford.

1853 ROBERT COKER NASH DAVIES, Rye, Sussex.

1852 WILLIAM DAVIES, M.D., Senior Physician to the Bath United Hospital; 10, Gay street, Bath.

1852 JOHN HALL DAVIS, M.D., Physician to the Royal Maternity Charity; Physician-Accoucheur to the St. George's and St. James's Dispensary; and Consulting Physician-Accoucheur to the St. Pancras Infirmary; 11, Harley street, Cavendish square.

1820 †THOMAS DAVIS, Boxmoor House, Herts. C. 1837, 1843.

1818 JAMES DAWSON, Liverpool.

1847 GEORGE EDWARD DAY, M.D., F.R.S., Chandos Professor of Anatomy, and Examiner in Medicine in the University of St. Andrew's.

1858 TEOFILO DELIMA, M.D., Caracas, Venezuela, South America.

1846 *SAMUEL BEST DENTON, M.D., Ivy Lodge, Hornsea, Hull.

1859 WILLIAM HOWSHIP DICKINSON, M.B., Medical Registrar and Demonstrator of Anatomy at St. George's Hospital; Assistant Physician to the Hospital for Sick Children; 11, Chesterfield street, May fair. *Trans.* 3.

1844 ROBERT DICKSON, M.D., F.L.S., Physician to the Scottish Hospital; 16, Hertford street, May fair. C. 1860.

Elected

1839 †JAMES DIXON, Surgeon to the Royal London Ophthalmic Hospital, Moorfields; and Consulting Ophthalmic Surgeon to the Asylum for Idiots; 2, Portman square, L. 1849-55. V.P. 1857-8. *Trans.* 4.

1845 JOHN DODD.

1857 ARCHIBALD DOUGLAS, M.D., 8, Clifton place, Sussex square, Hyde park.

1853 ROBERT DRUITT, M.R.C.P., Medical Officer of Health for St. George's, Hanover square; 37, Hertford street, May fair. *Trans.* 2.

1846 JOHN DRUMMOND, Inspector General of Fleets and Hospitals; Dover. *Trans.* 1.

1845 GEORGE DUFF, M.D., High street, Elgin.

1845 EDWARD WILLSON DUFFIN, 18, Devonshire street, Portland place. *Trans.* 1.

1833 ROBERT DUNN, 31, Norfolk street, Strand. C. 1845-6. *Trans.* 2.

1861 CLAUDIUS FRANCIS DU PASQUIER, Apothecary in Ordinary to H.M.'s Household; 62, Pall Mall.

1843 CHRISTOPHER MERCER DURRANT, M.D., Physician to the East Suffolk and Ipswich Hospital; Ipswich, Suffolk.

1839 HENRY SUMNER DYER, M.D., 37, Bryanston sq. C. 1854-5.

1836 JAMES WILLIAM EARLE, late of Norwich.

1824 GEORGE EDWARDS.

1823 CHARLES CHANDLER EGERTON, Kendall Lodge, Epping.

1861 *ROBERT ELLIOT, M.D., 18, Lowther street, Carlisle.

1848 GEORGE VINER ELLIS, Professor of Anatomy in University College, London; University College, Gower street. *Trans.* 2.

1854 *JAMES ELLISON, M.D., Surgeon in Ordinary to the Royal Household, Windsor; 14, High street, Windsor.

1835 WILLIAM ENGLAND, M.D., Ipswich, Suffolk.

1842 JOHN ERICHSEN, Professor of Surgery in University College, London, and Surgeon to University College Hospital; 6, Cavendish place, Cavendish square. C. 1855-6. *Trans.* 2.

1836 GEORGE FABIAN EVANS, M.D., Physician to the General Hospital, Birmingham.

Elected

1815 *Griffith Francis Dorsett Evans, M.D., St. Mary's, Bedford. C. 1838.

1845 William Julian Evans, M.D., Pinner, Middlesex.

1858 Randle Wilbraham Falconer, M.D., Physician to the Bath United Hospital; 22, Bennett street, Bath.

1844 Arthur Farre, M.D., F,R.S., Professor of Midwifery in King's College, London, and Physician for the Diseases of Women and Children, to King's College Hospital; 12, Hertford street, May fair. C. 1857.

1831 Robert Ferguson, M D., Physician Extraordinary to H.M. the Queen, and Consulting Physician to King's College Hospital; 125, Park street, Grosvenor square. C. 1839. V.P. 1847.

1841 William Fergusson, F.R.S., Surgeon Extraordinary to H.M. the Queen; Surgeon in Ordinary to H.R.H. the Prince Consort; Professor of Surgery in King's College, London, and Surgeon to King's College Hospital; Examiner in Surgery at the University of London; 16, George street, Hanover square. C. 1849-50. *Trans.* 4.

1852 *Alfred George Field, Surgeon to St. Mary's Hospital, Brighton; 28, Old Steine, Brighton.

1849 George Tupman Fincham, M.D., Physician to, and Lecturer on Medical Jurisprudence at, the Westminster Hospital; 2, Eccleston terrace south, Eccleston square.

1836 Sir John William Fisher, Surgeon-in-Chief to the Metropolitan Police Force; 5, Grosvenor gate. C. 1843-4.

1860 Thomas George Fitzgerald, Staff-Surgeon; 6, Whitehall yard.

1842 Thomas Bell Elcock Fletcher, M.D., Physician to the Birmingham General Hospital; Waterloo street, Birmingham. *Trans.* 1.

1859 William Henry Flower, Assistant-Surgeon to the Middlesex Hospital; 32, Queen Anne street, Cavendish square. *Trans.* 1.

1848 John Gregory Forbes, Surgeon to the Metropolitan Convalescent Institution; 9, Devonport street, Hyde park. *Trans.* 2.

Elected

1852 †JOHN COOPER FORSTER, Assistant Surgeon to, and Lecturer on Anatomy at, Guy's Hospital; Surgeon to the Royal Infirmary for Children, &c.; 11, Wellington street, Southwark. *Pro.* 1.

1859 EDWARD LONG FOX, M.B., Physician to the Bristol Royal Infirmary; 10, Berkeley square, Bristol.

1858 *WILSON FOX, M.D., Physician to the North Staffordshire Infirmary; Newcastle-under-Lyme, Staffordshire.

1856 JOHN F. FRANCE, Lecturer on Ophthalmic Surgery at Guy's Hospital, and Surgeon to the Eye Infirmary attached to the Hospital; 24, Bloomsbury square.

1841 JOHN CHRISTOPHER AUGUSTUS FRANZ, M.D., 11, Old Steine, Brighton.

1843 PATRICK FRASER, M.D., Physician to the London Hospital, and to the London Dispensary; 63, Grosvenor street.

1836 JOHN GEORGE FRENCH, Surgeon to the St. James's Infirmary; 41, Great Marlborough street. C. 1852-3.

1849 ROBERT TEMPLE FRERE, M.A., F.R.C.P., 34, Upper Harley street.

1846 HENRY WILLIAM FULLER, M.D., Physician to, and Lecturer on Medical Jurisprudence at, St. George's Hospital; 13, Manchester square. *Trans.* 2.

1815 *GEORGE FREDERICK FURNIVALL, Medical Attendant of Great Foster House Asylum for Lunatics; Egham, Surrey.

1860 ROBERT CAMERON GALTON, M.B., 48, Harley street.

1854 ALFRED BARING GARROD, M.D., F.R.S., Examiner in Materia Medica at the University of London; Professor of Materia Medica, Therapeutics, and Clinical Medicine in University College, London, and Physician to University College Hospital; 84, Harley street, Cavendish square. *Trans.* 8.

1857 GEORGE GREEN GASCOYEN, Assistant-Surgeon to the Lock Hospital, and Lecturer on Descriptive and Surgical Anatomy in the St. Mary's Hospital Medical School; 25, Oxford terrace, Hyde park. *Trans.* 1.

1851 GEORGE GASKOIN, 3, Westbourne park.

1819 HENRY GAULTER.

Elected

1848 JOHN GAY, Senior Surgeon to the Great Northern Hospital, and Consulting Surgeon to the Asylum for Idiots; 10, Finsbury place south.

1821 *RICHARD FRANCIS GEORGE, late Senior Surgeon to the Bath General Hospital; 10, Royal Crescent, Bath.

1854 BERNARD GILPIN, Belle Vue House, Ulverstone, Lancashire.

1858 BENJAMIN GODFREY, M.D., Carlton House, Enfield, Middlesex.

1851 STEPHEN JENNINGS GOODFELLOW, M.D., Physician to, and Lecturer on Medicine at, the Middlesex Hospital; 5, Savile row, Burlington gardens. *Trans.* 1.

1818 JAMES ALEXANDER GORDON, M.D., C.B., F.R.S., Parham House, Dorking. C. 1828. V.P. 1829. *Trans.* 1.

1851 PETER YEAMES GOWLLAND, Assistant-Surgeon to the London Hospital, and Surgeon to St. Mark's Hospital; 34, Finsbury square.

1844 JOHN GRANTHAM, Crayford, Kent.

1846 GEORGE THOMPSON GREAM, M.D., 2, Upper Brook street, Grosvenor square.

1816 JOSEPH HENRY GREEN, D.C.L., F.R.S., President of the Medical Council; Consulting Surgeon to St. Thomas's Hospital; Hadley, Middlesex. C. 1820. V.P. 1830. *Trans.* 1.

1843 ROBERT GREENHALGH, M.D., Physician-Accoucheur to St. Bartholomew's Hospital, and to the Samaritan Free Hospital for Women and Children; Consulting Physician-Accoucheur to the St. John's Wood Dispensary; 76, Grosvenor street.

1860 EDWARD HEADLAM GREENHOW, M.D., Assistant Physician to, and Lecturer on Public Health and on Medical Jurisprudence at, the Middlesex Hospital, and Physician to the Western General Dispensary; 77, Upper Berkeley street, Portman square.

1814 JOHN GROVE, M.D., Salisbury.

1852 JOHN GROVE, West Hill, Wandsworth, Surrey.

1860 HENRI GUENEAU DE MUSSY, M.D., 4, Cavendish place, Cavendish square.

Elected

1849 WILLIAM WITHEY GULL, M.D., Physician to, and Lecturer on Medicine at, Guy's Hospital; Member of the Senate of the University of London; 26, Brook street, Grosvenor square. *Trans.* 2.

1837 JAMES MANBY GULLY, M.D.; Great Malvern, Worcestershire.

1859 THEOPHILUS MILLER GUNN; 40, York place, Portman square.

1819 JOHN GUNNING, C.B., Inspector-General of Hospitals; Paris. C. 1823.

1854 SAMUEL OSBORNE HABERSHON, M.D., Assistant-Physician to, and Lecturer on Materia Medica and Therapeutics at, Guy's Hospital; 22, Wimpole street, Cavendish square. *Trans.* 1.

1849 HAMMETT HAILEY, Newport Pagnell, Bucks.

1845 SIR JOHN HALL, M.D., K.C.B., Inspector-General of Hospitals.

1848 ALEXANDER HALLEY, M.D., F.G.S., 7, Harley street, Cavendish square.

1819 †THOMAS HAMMERTON, 112, Piccadilly. C. 1829-30.

1838 HENRY HANCOCK, Surgeon to, and Lecturer on Surgery at, the Charing Cross Hospital; Surgeon to the Royal Westminster Ophthalmic Hospital; 37, Harley street, Cavendish square. C. 1851.

1849 *RICHARD JAMES HANSARD, Surgeon to the Radcliffe Infirmary; 5, Broad street, Oxford.

1848 *GEORGE HARCOURT, M.D., Chertsey, Surrey.

1836 JOHN FOSSE HARDING, Sandford House, Highbury New Park. C. 1858-9.

1856 CHARLES JOHN HARE, M.D., Physician to University College Hospital; 41, Brook street, Grosvenor square.

1857 GEORGE HARLEY, M.D., F.C.S., Professor of Medical Jurisprudence in University College, London; 77, Harley street, Cavendish square.

1859 FRANCIS HARRIS, M.D., Assistant-Physician to, and Lecturer on Botany at, St. Bartholomew's Hospital; Assistant-Physician to the Hospital for Sick Children; 24, Cavendish square.

1846 JOHN HARRISON, 2, the Court yard, Albany.

Elected

1843 THOMAS SUNDERLAND HARRISON, M.D., F.L.S., Innox Hill House, Frome, Somersetshire.

1841 WILLIAM HARVEY, Surgeon to the Royal Dispensary for Diseases of the Ear, and to the Freemasons' Female Charity, and Aural Surgeon to the Great Northern Hospital; 2, Soho square. C. 1854.

1855 ALFRED HAVILAND, Surgeon to the Bridgewater Infirmary; Bridgewater, Somerset.

1828 †CÆSAR HENRY HAWKINS, F.R.S., Surgeon Extraordinary to H.M. the Queen, and Consulting Surgeon to St. George's Hospital; 26, Grosvenor street. C. 1830-1, 1860. V.P. 1838-9. T. 1841-4. P. 1855-6. *Trans.* 12.

1838 CHARLES HAWKINS, *Treasurer*, Inspector of Anatomy; Consulting Surgeon to Queen Charlotte's Hospital; 22, Savile row, Burlington gardens. C. 1846-7. S. 1850. V.P. 1858. T. 1861. *Trans.* 2.

1848 THOMAS HAWKSLEY, M.D., Physician to the Margaret street Dispensary for Consumption and Diseases of the Chest; 26, George street, Hanover square.

1860 HENRY HOWARD HAYWARD, 56, Queen Anne street, Cavendish square.

1820 THOMAS EMERSON HEADLAM, M.D., Consulting Physician to the Newcastle Infirmary, Newcastle-upon-Tyne.

1848 *JAMES NEWTON HEALE, M.D., Physician to the Winchester County Hospital; Winchester, Hants.

1850 GEORGE HEATON, M.D., Boston, U.S.

1829 THOMAS HEBERDEN, M.D., 43, Park street, Grosvenor square.

1844 JOHN HENNEN, M.D. L. 1848-50.

1849 AMOS HENRIQUES, M.D., Hon. Physician to the Spanish Embassy; 67, Upper Berkeley Street, Portman square.

1848 MITCHELL HENRY, Surgeon to, and Lecturer on Medical Jurisprudence at, the Middlesex Hospital; Surgeon to the North London Eye Infirmary; 5, Harley street, Cavendish Square. *Trans.* 2.

1821 VINCENT HERBERSKI, M.D., Professor of Medicine in the University of Wilna.

Elected

1843 PRESCOTT GARDNER HEWETT, Surgeon to St. George's Hospital; 1, Chesterfield street, May fair. C. 1859. *Trans.* 7.

1855 GRAILY HEWITT, M.D., Physician to the British Lying-in Hospital; Lecturer on Midwifery and the Diseases of Women and Children at St. Mary's Hospital; 36, Berkeley square.

1853 THOMAS HEWLETT, Surgeon to Harrow School; Harrow, Middlesex. *Trans.* 1.

1841 *NATHANIEL HIGHMORE, Sherborne, Dorsetshire.

1854 THOMAS HILLIER, M.D., Medical Officer of Health for St. Pancras, and Assistant Physician to the Hospital for Sick Children; 21, Upper Gower street.

1842 WILLIAM AUGUSTUS HILLMAN, Senior Assistant-Surgeon to the Westminster Hospital; 1, Argyll street, Regent street. C. 1858-9.

1841 †JOHN HILTON, F.R.S., Surgeon to, and Lecturer on Surgery at, Guy's Hospital; Consulting Surgeon to the Royal General Dispensary, St. Pancras; Professor of Anatomy and Surgery at the Royal College of Surgeons; 10, New Broad street, City. C. 1851. *Trans.* 3.

1859 FRANCIS HIRD, Assistant-Surgeon to, and Lecturer at, the Charing Cross Hospital; 17, Clifford street, Bond street.

1840 THOMAS HODGKIN, M.D., Consulting Physician to the Hospital for Diseases of the Skin, and Member of the Senate of the University of London; 35, Bedford square. C. 1842-3. *Trans.* 6.

1813 JOSEPH HODGSON, F.R.S., 60, Westbourne terrace, Hyde park gardens. C. 1817. P. 1851-2. *Trans.* 1.

1861 *WILLIAM CARTER HOFFMEISTER, M.D., Surgeon to H.M. the Queen in the Isle of Wight; Cowes, Isle of Wight.

1843 LUTHER HOLDEN, Assistant-Surgeon to, and Lecturer on Anatomy at, St. Bartholomew's Hospital; Surgeon to the Metropolitan Dispensary; 54, Gower street, Bedford square. C. 1859.

Elected

1814 †Sir Henry Holland, Bart., M.D., D.C.L., LL.D., F.R.S., Physician in Ordinary to H.M. the Queen, and to H.R.H. the Prince Consort; 25, Brook street, Grosvenor square. C. 1817, 1833-4. V.P. 1826, 1840. *Trans.* 1.

1861 William Henry Holman, M.B., Lond.; 9, Chalcot's villas, Adelaide road, Haverstock hill.

1856 Timothy Holmes, Assistant-Surgeon to, and Lecturer on Operative Surgery at, St. George's Hospital, and Surgeon to the Hospital for Sick Children; 22, Queen street, May fair. *Trans.* 2.

1846 Barnard Wight Holt, Senior Surgeon to, and Lecturer on Clinical Surgery at, the Westminster Hospital; Medical Officer of Health for Westminster; 14, Savile row, Burlington Gardens.

1846 Carsten Holthouse, Surgeon to, and Lecturer on Anatomy at, the Westminster Hospital; Surgeon to the South London Ophthalmic Hospital; 2, Storey's gate, St. James's park.

1853 William Charles Hood, M.D., F.L.S., Resident Physician and Medical Superintendent of Bethlem Hospital. *Trans.* 1.

1828 *Edward Howell, M.D., Senior Consulting Physician to the Swansea Infirmary; 2, South Hill place, Swansea, Glamorganshire.

1857 John Whitaker Hulke, Assistant-Surgeon to King's College Hospital, and to the Royal London Ophthalmic Hospital, Moorfields; 10, Old Burlington street. *Trans.* 2.

1857 Edward Charles Hulme, Surgeon to the Central London Ophthalmic Hospital, and Examining Surgeon to the Marine Society; 19, Gower street, Bedford square. *Trans.* 1.

1844 Edwin Humby, 83, Hamilton Terrace, St. John's Wood.

1855 George Murray Humphry, M.D., F.R.S., Surgeon to Addenbrooke's Hospital, and Lecturer on Anatomy in the Cambridge University Medical School; Cambridge. *Trans.* 3.

Elected

1849 EDWARD LAW HUSSEY, Surgeon to the Radcliffe Infirmary; St. Aldate's, Oxford. *Trans.* 1.

1856 JONATHAN HUTCHINSON, Assistant-Surgeon to, and Joint Lecturer on Surgery at, the London Hospital; Surgeon to the Metropolitan Free Hospital; 4, Finsbury circus. *Pro.* 2.

1820 WILLIAM HUTCHINSON, M.D.

1840 CHARLES HUTTON, M.D., Physician to the General Lying-in Hospital, and to the Royal Infirmary for Children and Women; 26, Lowndes street, Belgrave square. C. 1858-9.

1847 WILLIAM EDMUND IMAGE, Senior Surgeon to the Suffolk General Hospital; Bury St. Edmund's, Suffolk. *Trans.* 1.

1856 CORNELIUS INGLIS, M.D.

1826 WILLIAM INGRAM, Midhurst, Sussex.

1845 *HENRY JACKSON, Senior Surgeon to the Sheffield General Infirmary; St. James's row, Sheffield, Yorkshire.

1841 PAUL JACKSON, 24, Wimpole Street, Cavendish square.

1841 MAXIMILIEN MORRIS JACOBOVICS, M.D., Vienna.

1825 JOHN B. JAMES, M.D.

1847 *WILLIAM WITHALL JAMES, Surgeon to the Devon and Exeter Hospital; Exeter, Devonshire.

1844 SAMUEL JOHN JEAFFRESON, M.D., Physician to the Warneford Hospital, and Warwick Dispensary; Leamington, Warwickshire.

1839 JULIUS JEFFREYS, F.R.S., Kingston, Surrey.

1840 *GEORGE SAMUEL JENKS, M.D., 18, Circus, Bath.

1851 WILLIAM JENNER, M.D., Physician Extraordinary to H.M. the Queen, Examiner in Medicine at the University of London; Physician to University College Hospital; Physician to the Hospital for Sick Children; 8, Harley street, Cavendish square. *Trans.* 3.

1848 ATHOL ARCHIBALD WOOD JOHNSON, Lecturer on Anatomy and Physiology at St. George's Hospital Medical School; 8, Suffolk place, Pall Mall East. *Trans.* 1.

Elected

1851 EDMUND CHARLES JOHNSON, M.D., Corresponding Member of the Imperial Society of Florence; 6, Savile row.

1821 SIR EDWARD JOHNSON, M.D., Weymouth, Dorsetshire.

1847 GEORGE JOHNSON, M.D., Professor of Materia Medica and Therapeutics in King's College, London, and Physician to King's College Hospital; 11, Savile row, Burlington gardens. *Trans.* 5.

1837 HENRY CHARLES JOHNSON, *Vice-President*, Surgeon to St. George's Hospital; 6, Savile row, Burlington gardens. C. 1850-1. V. P. 1860-1.

1844 †HENRY BENCE JONES, M.D., F.R.S., Physician to St. George's Hospital; 31, Brook street, Grosvenor square. C. 1855-6. *Trans.* 11.

1835 HENRY DERVICHE JONES, 23, Soho square. C. 1854-5.

1853 THOMAS WHARTON JONES, F.R.S., Professor of Ophthalmic Surgery in University College, London, and Ophthalmic Surgeon to University College Hospital; 35, George street, Hanover square. *Trans.* 1.

1837 THOMAS WILLIAM JONES, M.D., 19, Finsbury pavement. C. 1858.

1859 WILLIAM PRICE JONES, M.D., Surbiton, Kingston.

1829 *GEORGE CHARLES JULIUS, Richmond, Surrey.

1816 *GEORGE HERMANN KAUFFMANN, M.D., Hanover.

1848 *DANIEL BURTON KENDELL, M.D., Kettlethorpe Hall, Wakefield, Yorkshire.

1847 ALFRED KEYSER, 21, Norfolk crescent, Oxford square.

1857 HENRY WALTER KIALLMARK, late Staff Surgeon, 2nd class, attached to the Ottoman Army; 46, Prince's square, Westbourne grove.

1839 *DAVID KING, M.D., Medical Officer of Health for Eltham; Eltham, Kent.

1851 JOHN ABERNETHY KINGDON, Surgeon to the City of London Truss Society, and to the City Dispensary; 2, New Bank buildings, City.

1858 WILLIAM SENHOUSE KIRKES, M.D., Assistant-Physician to, and Lecturer on Medicine at, St. Bartholomew's Hospital; 2, Lower Seymour street, Portman square. *Trans.* 1.

Elected

1855 JAMES ROBERT LANE, Surgeon to, and Lecturer on Anatomy and Physiology at, St. Mary's Hospital; and Surgeon to the Lock and St. Mark's Hospitals; 1, Grosvenor place.

1840 SAMUEL ARMSTRONG LANE, Surgeon to, and Lecturer on Surgery at, St. Mary's Hospital, and Consulting Surgeon to the Lock Hospital; 1, Grosvenor place. C. 1849-50.

1841 *CHARLES LASHMAR, M.D., 83, North End, Croydon, Surrey.

1816 G. E. LAWRENCE.

1809 †WILLIAM LAWRENCE, F.R.S., Serjeant-Surgeon to H.M. the Queen; Surgeon to, and Lecturer on Surgery at, St. Bartholomew's Hospital, and Surgeon to Bridewell, and Bethlem Hospital; Foreign Associate of the Imperial Academy of Medicine of Paris; 18, Whitehall place. S. 1813-7. V.P. 1818-9. T. 1821-6 P. 1831-2. C. 1820, 1833-4, 1842-3. *Trans.* 18.

1840 THOMAS LAYCOCK, M.D., F.R.S.E., Professor of the Practice of Medicine in the University of Edinburgh, and Physician to the Edinburgh Royal Infirmary; 4, Rutland street, Edinburgh.

1843 *JESSE LEACH, Moss Hall, Heywood, near Bury, Lancashire.

1822 JOHN JOSEPH LEDSAM, M.D., 17, Esplanade, Scarborough Yorkshire.

1823 †HENRY LEE, M.D., Weather Oak, Alvechurch, near Bromsgrove, Worcestershire. C. 1837. S. 1839-40.

1843 HENRY LEE, Assistant-Surgeon to, and Lecturer on Pathology at, St. George's Hospital, and Senior Surgeon to the Lock Hospital; 9, Savile row, Burlington gardens. C. 1856-7. *Trans.* 6. *Pro.* 1.

1822 †ROBERT LEE, M.D., F.R.S., Obstetric Physician to, and Lecturer on Midwifery at, St. George's Hospital; Corresponding Member of the Imperial Academy of Medicine, Paris; 4, Savile row, Burlington gardens. C. 1829, 1834. S. 1830-3. V.P. 1835. *Trans.* 23.

1836 FREDERICK LEIGHTON, M.D., Frankfort-on-the-Maine.

1854 HANANEL DE LEON, M.D., Bronsham road, Bedford.

Elected

1856 DAVID LEWIS, M.D., Physician to the Royal Society of Ancient Britons' Schools.

1847 SIR JOHN LIDDELL, M.D., C.B., F.R.S., Hon. Physician to H.M. the Queen, Director-General of the Medical Department of the Navy; Admiralty, Somerset House, and 72, Chester square.

1806 JOHN LIND, M.D.

1845 WILLIAM JOHN LITTLE, M.D., Physician to the London Hospital; 34, Brook street, Grosvenor square.

1819 ROBERT LLOYD, M.D.

1824 †EUSEBIUS ARTHUR LLOYD, Surgeon to Christ's Hospital; Ventnor, Isle of Wight. S. 1827-8. V.P. 1838. C. 1843–4. *Trans.* 2.

1820 J. G. LOCHER, M.C.D., Town Physician of Zurich. *Trans.* 2.

1824 †SIR CHARLES LOCOCK, Bart., M.D., First Physician-Accoucheur to H.M. the Queen, and Consulting Physician to the General Lying-in Hospital; Member of the Senate of the University of London; 26, Hertford street, May fair. C. 1826. V.P. 1841. P. 1857-8. *Trans.* 1.

1852 CHARLES LODGE, M.D.

1846 HENRY THOMAS LOMAX, Surgeon to the County Police; St. Mary's grove, Stafford.

1860 THOMAS LONGMORE, Deputy Inspector-General and Professor of Clinical and Military Surgery; New Army Medical School, Chatham.

1836 JOSEPH S. LÖWENFELD, M.D., Berbice.

1852 JAMES LUKE, F.R.S., Consulting Surgeon to the London Hospital, and Surgeon to St. Luke's Hospital for Lunatics; 37, Broad street buildings, City. C. 1858. *Trans.* 4.

1857 FELIX WILLIAM LYON, M.D., Lyndhurst, Hants.

1846 WILLIAM M'EWEN, M.D., Surgeon to Chester Castle; 27, Nicholas street, Chester.

1823 †GEORGE MACILWAIN, Consulting Surgeon to the Finsbury Dispensary and the St. Ann's Society's Schools; 3, the Court yard, Albany. C. 1829-30. V.P. 1848. *Trans.* 1.

Elected

1822 RICHARD MACINTOSH, M.D.

1859 *JOHN M'INTYRE, M.D., Odiham, Hants.

1848 FREDERICK WILLIAM MACKENZIE, M.D., Senior Physician to the Western General Dispensary; 11, Chester place, Hyde park square. *Trans.* 2.

1818 WILLIAM MACKENZIE, M.D., Surgeon-Oculist to H.M. the Queen in Scotland, and Surgeon to the Glasgow Eye Infirmary; 49, Bath street, Glasgow. *Trans.* 2.

1854 *DRAPER MACKINDER, M.D., Consulting Surgeon to the Dispensary, Gainsborough, Lincolnshire.

1844 DANIEL MACLACHLAN, M.D., Physician to the Royal Hospital, Chelsea, and Deputy Inspector-General of Hospitals; Royal Hospital, Chelsea. C. 1860-1. *Trans.* 1.

1860 JOHN MACLEAN, M.D., 24, Portman street, Portman square.

1851 SAMUEL MACLEAN, 10, Conduit street, Bond street.

1849 DUNCAN MACLACHLAN MACLURE, 16, Harley street, Cavendish square.

1842 JOHN MACNAUGHT, M.D., Bedford street, Liverpool.

1837 ANDREW MELVILLE M'WHINNIE, Assistant-Surgeon to the London Hospital for Diseases of the Skin, Blackfriars; 5, Crescent, New Bridge street, Blackfriars. C. 1851-2. *Trans.* 1.

1855 WILLIAM MARCET, M.D., F.R.S., Assistant-Physician to, and Lecturer on Chemistry at, the Westminster Hospital; 4, George street, Hanover square. *Trans.* 1.

1848 WILLIAM ORLANDO MARKHAM, M.D., Physician to, and Lecturer on General and Morbid Anatomy at, St. Mary's Hospital; 33, Clarges street, Piccadilly. *Trans.* 2.

1838 THOMAS PARR MARSH, M.D., Consulting Physician to the Salop Infirmary, Shrewsbury; Powyn, Merionethshire.

1851 JOHN MARSHALL, F.R.S., Surgeon to University College Hospital; 10, Savile row, Burlington gardens. *Trans.* 2.

1841 SIR JAMES RANALD MARTIN, K.C.B., F.R.S., Examining Medical Officer to the Secretary of State for India in Council; 24, Mount street, Grosvenor square. C. 1853.

1849 GEORGE BELLASIS MASFEN, Ghazeepore, India.

Elected

1853 WILLIAM EDWARD MASFEN, Surgeon to the Staffordshire General Infirmary; Stafford.

1837 THOMAS MAYO, M.D., F.R.S., President of the Royal College of Physicians, and Honorary Physician to the St. Marylebone Infirmary; 56, Wimpole street, Cavendish square. S. 1841. C. 1847-8. V.P. 1851-2.

1839 RICHARD HENRY MEADE, Senior Surgeon to the Bradford Infirmary; Bradford, Yorkshire. *Trans.* 1.

1837 SAMUEL WILLIAM JOHN MERRIMAN, M.D., Consulting Physician-Accoucheur to the Westminster General Dispensary, and Physician-Accoucheur to the Western General Dispensary; 3, Charles Street, Westbourne terrace. C. 1851-2. *Trans.* 1.

1852 JAMES MERRYWEATHER, 57, Brook street, Grosvenor square.

1847 EDWARD MERYON, M.D., F.G.S., 14, Clarges street, Piccadilly. L. 1859-60. *Trans.* 1.

1815 AUGUSTUS MEYER, M.D., St. Petersburgh.

1840 RICHARD MIDDLEMORE, Consulting Surgeon to the Birmingham Eye Infirmary; Temple row, Birmingham.

1854 EDWARD ARCHIBALD MIDDLESHIP, late of Richmond, Surrey.

1860 *HERBERT CHALMERS MILES, Assistant-Surgeon in the Royal Artillery, Medical Officer to the Royal Ordnance Corps and Department; Halifax, Nova Scotia, and 17, Whitehall place.

1818 *PATRICK MILLER, M.D., F.R.S.E., Senior Physician to the Devon and Exeter Hospital, and to St. Thomas's Hospital for Lunatics; the Grove, Exeter, Devonshire.

1844 NATHANIEL MONTEFIORE, 36, Hyde park gardens.

1848 CHARLES HEWITT MOORE, *Secretary*, Surgeon to, and Lecturer on Anatomy at, the Middlesex Hospital; 102, Piccadilly. L. 1858. S. 1859-61. *Trans.* 3.

1836 GEORGE MOORE, M.D., Hastings, Sussex.

1857 JOHN MORGAN, 3, Sussex place, Hyde park gardens.

1851 FREDERICK JOHN MOUAT, M.D., Professor of Medicine in the Medical College of Calcutta, Secretary of the Council of Education in India, and Inspector-General of Gaols, Lower Provinces; Calcutta.

Elected

1856 CHARLES MURCHISON, M.D., Physician to the London Fever Hospital; Assistant-Physician to, and Lecturer on Pathological Anatomy at, the Middlesex Hospital; 79, Wimpole street, Cavendish square. *Trans.* 2.

1847 SIMON MURCHISON, Bicester, Oxon.

1859 GEORGE NAYLER, Assistant-Surgeon to the Warley Depôt; Warley Barracks, Brentwood, and Junior United Service Club.

1835 THOMAS ANDREW NELSON, M.D., 10, Nottingham terrace, York gate, Regent's park.

1843 EDWARD NEWTON, 30, Fitzroy square.

1851 JAMES NICHOLS, M.D., 13, Savile row, Burlington gardens.

1849 HENRY BURFORD NORMAN, Portland Lodge, Southsea, Hants.

1845 HENRY NORRIS, Charmouth, Dorset.

1847 *WILLIAM EDWARD CHARLES NOURSE, Assistant-Surgeon to St. Mary's Hospital, Brighton; 11, Old Steine, Brighton.

1849 ARTHUR NOVERRE, 25, South street, Park lane.

1859 *THOMAS NUNNELEY, Senior Surgeon to the Leeds Eye and Ear Infirmary; Leeds. *Trans.* 1.

1847 THOMAS O'CONNOR, March, Cambridgeshire.

1843 WILLIAM O'CONNOR, M.D., Physician to the Royal Free Hospital; 30, Upper Montagu street, Montagu square.

1846 FRANCIS ODLING, 52, Devonshire street, Portland place.

1858 WILLIAM MACKAY OGILVIE, Surgeon, R.N.

1858 JOHN WILLIAM OGLE, M.D., Assistant-Physician to St. George's Hospital; 13, Upper Brook street, Grosvenor square. *Trans.* 3.

1855 *WILLIAM OGLE, M.A., M.D., Physician to the Derby Infirmary; 3, Stewart terrace, Derby.

1860 WILLIAM OGLE, M.D., Oxford and Cambridge University Club; Pall Mall.

Elected

1850 HENRY OLDHAM, M.D., Obstetric Physician to, and Clinical Lecturer on Midwifery at, Guy's Hospital, and Obstetric Physician to the Tower Hamlets Dispensary; 26, Finsbury square. *Trans.* 1.

1846 *EDWARD LATHAM ORMEROD, M.D., Physician to the Sussex County Hospital; 14, Old Steine, Brighton. *Trans.* 2.

1847 *WILLIAM BOUSFIELD PAGE, Surgeon to the Cumberland Infirmary; Carlisle. *Trans.* 2.

1840 JAMES PAGET, F.R.S., *Vice-President*, Surgeon Extraordinary to H.M. the Queen; Surgeon to St. Bartholomew's Hospital, and Member of the Senate of the University of London; 1, Harewood place, Hanover square. C. 1848-9. V.P. 1861. *Trans.* 8.

1858 *WILLIAM PALEY, M.D., Physician to the Ripon Dispensary; Ripon, Yorkshire.

1861 JAMES PALFREY, M.D., Assistant-Physician to the Metropolitan Free Hospital; 12, Wellington street, Southwark.

1836 LANGSTON PARKER, Hon. Surgeon to the Queen's Hospital, Birmingham; Colmore row, Birmingham.

1847 NICHOLAS PARKER, M.D., Assistant-Physician to, and Lecturer on Medicine at, the London Hospital; 22, Finsbury square.

1841 JOHN PARKIN, M.D., Rome.

1851 JAMES PART, M.D., 7, Camden road villas, Camden town.

1828 †RICHARD PARTRIDGE, F.R.S., Professor of Anatomy to the Royal Academy of Arts, Surgeon to King's College Hospital, and Professor of Anatomy in King's College, London; 17, New street, Spring gardens. S. 1832-6. C. 1837-8. V.P. 1847-8. C. 1861.

1845 THOMAS BEVILL PEACOCK, M.D., Physician to, and Lecturer on Medicine at, St. Thomas's Hospital; Physician to the City of London Hospital for Diseases of the Chest, Victoria park; 20, Finsbury circus. S. 1855-6. *Trans.* 2.

1856 RICHARD KING PEIRCE, 16, Norland place, Notting hill.

1830 CHARLES P. PELECHIN, M.D., St. Petersburgh.

Elected

1855 *Oliver Pemberton, Surgeon to the Birmingham General Hospital, and Lecturer on Surgical Pathology at Sydenham College; 18, Temple row, Birmingham. *Trans.* 1.

1844 William Vesalius Pettigrew, M.D., Surgeon to the Female Orphan Asylum, Lambeth; 7, Chester street, Grosvenor place.

1848 Edward Phillips, M.D., F.L.S., Physician to the Coventry and Warwickshire Hospital; Coventry, Warwickshire.

1852 Richard Phillips, 52 Leinster square, Westbourne grove.

1854 Thomas Bacon Phillips, M.D., Physician to the Convalescent Home and to the Brighton Dispensary; 36, Lansdowne place, Brighton.

1846 Francis Richard Philp, M.D., Colby House, Kensington.

1851 *James Hollins Pickford, M.D., M.R.I.A., 1, Cavendish place, Brighton.

1851 John Picton, M.D.

1836 Isaac Pidduck, M.D., Physician to the Bloomsbury Dispensary; 22, Montague street, Russell square. *Pro.* 2.

1852 Henry Pilleau, Deputy Inspector-General of Hospitals (India).

1841 Henry Alfred Pitman, M.D., Physician to, and Lecturer on Medicine at, St. George's Hospital; Consulting Physician to the Royal General Dispensary, St. Pancras; 94, Gloucester place, Portman square. L. 1851-3. C. 1861.

1850 Alfred Poland, Assistant-Surgeon to, and Lecturer on Anatomy at, Guy's Hospital; Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 10, Bolton row, May fair.

1845 George David Pollock, F.L.S., *Librarian*, Surgeon to, and Lecturer on Anatomy at, St. George's Hospital; 27, Grosvenor street. C. 1856-7. L. 1859-61. *Trans.* 2.

1843 Charles Pope, M.D., Glastonbury, Somersetshire.

1846 Jephson Potter, M.D., F.L.S., 109, Upper Parliament street, Liverpool.

1842 James Powell, M.B.

1851 Robert Francis Power, M.D., 7, Lower Grosvenor place.

Elected

1857 WILLIAM OVEREND PRIESTLEY, M.D., Physician-Accoucheur to, and Lecturer on Midwifery at, the Middlesex Hospital; Physician-Accoucheur to the St. Marylebone Infirmary; 31, Somerset street, Portman square.

1839 JOHN PROPERT, Consulting Surgeon to the Society of Ancient Britons; 6, New Cavendish street, Portland place.

1845 JOHN PYLE, 56, Oxford terrace, Hyde park. C. 1860.

1830 JONES QUAIN, M.D., Paris.

1850 RICHARD QUAIN, M.D., Physician to the Hospital for Consumption and Diseases of the Chest, and Member of the Senate of the University of London; 23, Harley street, Cavendish square. *Trans.* 1.

1835 RICHARD QUAIN, F.R.S., Professor of Clinical Surgery in University College, London, and Surgeon to University College Hospital; Consulting Surgeon to the Eye Infirmary attached to the Hospital; 32, Cavendish square. C. 1838-9. L. 1846-8. T. 1851-3. V.P. 1856-7. *Trans.* 1. *Pro.* 2.

1852 CHARLES BLAND RADCLIFFE, M.D., Physician to, and Lecturer on Materia Medica at, the Westminster Hospital; 4, Henrietta street, Cavendish square.

1857 HENRY RANKE, M.D., Munich.

1854 WILLIAM HENRY RANSOM, M.D., Physician to the Nottingham General Hospital; Nottingham.

1859 HENRY HUNTER RAYMOND, 21, Ridgway place, Wimbledon, Surrey.

1858 FREDERICK GEORGE REED, M.D., 46, Hertford street, May fair.

1821 HENRY REEDER, M.D.

1857 GEORGE OWEN REES, M.D., F.R.S., Physician to, and Lecturer on Medicine at, Guy's Hospital; Examiner in Materia Medica at the University of London; 26, Albemarle street, Piccadilly. *Trans.* 1.

1855 JOHN RUSSELL REYNOLDS, M.D., Assistant-Physician to University College Hospital; 38, Grosvenor street.

1847 SAMUEL RICHARDS, M.D., 36, Bedford square.

Elected

1852 CHRISTOPHER THOMAS RICHARDSON, M.B., Physician to the Metropolitan Free Hospital; 16, Hinde street, Manchester square.

1829 SIR JOHN RICHARDSON, Knt., M.D., LL.D., C.B., F.R.S., Inspector of Hospitals and Fleets; Lancrigg, Grasmere, Westmoreland.

1849 *WILLIAM RICHARDSON, M.D., 9, Ephraim road, Tunbridge Wells, Kent.

1845 BENJAMIN RIDGE, M.D., 21, Bruton street, Berkeley square.

1843 JOSEPH RIDGE, M.D., 39, Dorset square. C. 1858. *Pro.* 1.

1852 CHARLES RIDLEY, Surgeon to the Royal Society for Protection of Life from Fire; 6, Charlotte street, Bedford sq.

1852 JOHN ROBERTS, M.R.C.P., 75, Grosvenor street.

1829 *ARCHIBALD ROBERTSON, M.D., F.R.S., 11, West mall, Clifton, Bristol.

1855 CHARLES ALEXANDER LOCKHART ROBERTSON, M.D., Medical Superintendent of the Sussex County Lunatic Asylum, and Hon. Secretary to the Association of Medical Officers of Asylums and Hospitals for the Insane; Hayward's Heath, Sussex.

1857 JOHN GEORGE ROBERTSON, Belmullet, County Mayo.

1843 GEORGE ROBINSON, M.D., Physician to the Newcastle-upon-Tyne Dispensary; Eldon square, Newcastle-upon-Tyne. *Trans.* 2.

1843 WILLIAM RODEN, M.D., the Grange, Kidderminster, Worcestershire.

1835 GEORGE HAMILTON ROE, M.D., Senior Physician to the Hospital for Consumption and Diseases of the Chest; 57, Park street, Grosvenor square. C. 1841-2. *Trans.* 1.

1836 ARNOLD ROGERS, Consulting Surgeon-Dentist to St. Bartholomew's Hospital; 16, Hanover square.

1846 WILLIAM RICHARD ROGERS, M.D., Physician to the Samaritan Free Hospital for Women and Children, and to the Western General Lying-in Institution; 56, Berners street.

1829 WILLIAM SUDLOW ROOTS, F.L.S., Surgeon to the Royal Establishment at Hampton Court; Kingston, Surrey.

1850 GEORGE ROPER, 180, Shoreditch.

Elected

1836 RICHARD ROSCOE, M.D.

1855 THOMAS TATTERSALL ROSCOW, M.D.

1836 *CALEB BURRELL ROSE, F.G.S., 25, King street, Great Yarmouth, Norfolk. *Trans.* 1.

1857 HENRY COOPER ROSE, M.D., High street, Hampstead.

1849 CHARLES HENRY FELIX ROUTH, M.D., Physician to the Samaritan Free Hospital for Women and Children; 52, Montagu square. *Trans.* 1.

1845 HENRY MORTIMER ROWDON, M.D., Member of the Court of Examiners of the Society of Apothecaries; 29, Nottingham place, Marylebone road.

1834 HENRY WYLDBORE RUMSEY, Gloucester lodge, Cheltenham.

1845 JAMES RUSSELL, M.D., Physician to the Birmingham General Hospital, and Lecturer on Pathology and Therapeutics at Sydenham College; 91, New Hall street, Birmingham.

1851 HENRY HYDE SALTER, M.D., F.R.S., Assistant-Physician to, and Lecturer on Physiology and Pathology at, the Charing Cross Hospital; 6, Montague street, Russell square.

1856 SAMUEL JAMES A. SALTER, F.L.S., Surgeon-Dentist to, and Lecturer on Dental Surgery at, Guy's Hospital; 17, New Broad street, City. *Trans.* 1.

1849 HUGH JAMES SANDERSON, M.D., Physician to the Hospital for Women; 26, Upper Berkeley street, Portman square.

1855 JOHN BURDON SANDERSON, M.D., Assistant-Physician to the Hospital for Consumption; Medical Officer of Health for Paddington; Lecturer on Medical Jurisprudence at St. Mary's Hospital; 9, Gloucester place, Hyde park.

1847 WILLIAM HENRY OCTAVIUS SANKEY, M.D., Middlesex County Lunatic Asylum, Hanwell.

1845 EDWIN SAUNDERS, Surgeon-Dentist to H.M. the Queen, and to H.R.H. the Prince Consort; 13A, George street, Hanover square.

1834 LUDWIG V. SAUVAN, M.D., Warsaw.

1859 WILLIAM SCOVELL SAVORY, F.R.S., Assistant-Surgeon to, and Lecturer on General Anatomy and Physiology at, St. Bartholomew's Hospital; 13, Charterhouse square. *Trans.* 2.

Elected

1840 AUGUSTIN SAYER, M.D., Consulting Physician to the Lock Hospital; 28, Upper Seymour street, Portman square.

1853 MAURICE SCHULHOF, M.D., Physician to the Royal General Dispensary, Bartholomew Close; 14, Brook street, Grosvenor square.

1861 *WILLIAM SCOTT, M.D., Physician to the Huddersfield Infirmary; 12, New North road, Huddersfield.

1858 *GEORGE SCRATCHLEY, M.D., New Orleans, Louisiana, U.S.

1856 EDWIN SERCOMBE, Surgeon-Dentist to St. Mary's Hospital; 49, Brook street, Grosvenor square. *Trans.* 1. *Pro.* 1.

1824 †EDWARD JAMES SEYMOUR, M.D., F.R.S., Consulting Physician to the Seamen's Hospital Ship 'Dreadnought;' 13, Charles street, Berkeley square. C. 1826, 1831. S. 1827-8. V.P. 1830, 1842. *Trans.* 2.

1840 WILLIAM SHARP, M.D., F.R.S., Horton House, Rugby. *Trans.* 1.

1837 WILLIAM SHARPEY, M.D., F.R.S., LL.D., Examiner in Anatomy at the University of London, Professor of Anatomy and Physiology in University College, London, and Secretary of the Royal Society; 33, Woburn place, Russell square. C. 1848-9.

1836 ALEXANDER SHAW, Surgeon to, and Lecturer on Surgery at, the Middlesex Hospital; 22A, Cavendish square. C. 1842. S. 1843-4. V.P. 1851-2. T. 1858-60. *Trans.* 4.

1848 *EDWARD JAMES SHEARMAN, M.D., Rotherham, Yorkshire.

1859 SEPTIMUS WILLIAM SIBLEY, Lecturer on Pathological Anatomy at the Middlesex Hospital; 12, New Burlington street. *Trans.* 3.

1849 FRANCIS SIBSON, M.D., F.R.S., Physician to, and Lecturer on Medicine at, St. Mary's Hospital; 40, Brook street, Grosvenor square. *Trans.* 1.

1848 EDWARD HENRY SIEVEKING, M.D., *Secretary*, Physician to, and Lecturer on Materia Medica at, St. Mary's Hospital; 17, Manchester square. C. 1859-60. S. 1861. *Trans.* 2.

1842 JOHN SIMON, F.R.S., Surgeon to, and Lecturer on Pathology at, St. Thomas's Hospital; Medical Officer of the Privy Council; 44, Cumberland street, Bryanston square. C. 1854-55. *Trans.* 1.

Elected

1857 JAMES LEWIS SIORDET, M.B.

1827 GEORGE ROBERT SKENE, Bedford.

1824 †FREDERIC CARPENTER SKEY, F.R.S., Surgeon to, and Lecturer on Anatomy at, St. Bartholomew's Hospital; 13, Grosvenor street. C. 1828. L. 1829-31. V.P. 1841-2. P. 1859-60. *Trans.* 1.

1852 CHARLES CASE SMITH, Consulting Surgeon to the Suffolk General Hospital; Bury St. Edmund's, Suffolk.

1854 EDWARD SMITH, M.D., LL.B., F.R.S., Assistant-Physician to the Hospital for Consumption and Diseases of the Chest; 16, Queen Anne street, Cavendish square. *Trans.* 5.

1835 JOHN GREGORY SMITH, Harewood, Leeds, Yorkshire.

1843 ROBERT WILLIAM SMITH, M.D., M.R.I.A., Professor of Surgery in the University of Dublin; Surgeon to the Richmond Hospital; 63, Eccles street, Dublin.

1838 SPENCER SMITH, Surgeon to, and Lecturer on Surgery at, St. Mary's Hospital; 48, Sussex gardens, Hyde park. C. 1854. S. 1855-8. V.P. 1859-60.

1845 WILLIAM SMITH, Chesterfield, Derbyshire.

1847 WILLIAM SMITH, M.D., Consulting Physician to the Weymouth Infirmary; Weymouth, Dorsetshire.

1850 WILLIAM TYLER SMITH, M.D., Examiner in Midwifery at the University of London; Physician-Accoucheur to, and Lecturer on Midwifery at, St. Mary's Hospital; 7, Upper Grosvenor street. *Trans.* 2.

1851 JOHN SODEN, Surgeon to the Bath United Hospital, and Consulting Surgeon to the Bath Eye Infirmary; 24, Circus, Bath. *Trans.* 2.

1816 *JOHN SMITH SODEN, 101, Sidney place, Bath. *Trans.* 1.

1830 SAMUEL SOLLY, F.R.S., Surgeon to St. Thomas's Hospital, and Consulting Surgeon to the Royal General Dispensary, Bartholomew Close; 18, St. Helen's place, Bishopsgate street. L. 1838-40. C. 1845-6. V.P. 1849-50. *Trans.* 6.

1844 FREDERICK ROBERT SPACKMAN, M.D., Harpenden, St. Alban's.

1834 JAMES SPARK, Italy.

Elected

1851 ROBERT JOHN SPITTA, M.B., Medical Officer to the Clapham General Dispensary; Clapham, Surrey. *Trans.* 1.

1843 *STEPHEN SPRANGER, Hursley, Hampshire.

1858 JOSHUA HARRISON STALLARD, M.B. Lond., Physician to the St. George's and St. James's Dispensary; 2, Buckingham villas, Ladbroke road, Notting hill.

1815 †EDWARD STANLEY, F.R.S., Surgeon Extraordinary to H.M. the Queen; Consulting Surgeon to St. Bartholomew's Hospital; 23A, Brook street, Grosvenor square. C. 1821-2, 1835, 1845-6, 1852-3. S. 1824. V.P. 1827, 1839-40. T. 1832-4. P. 1843-4. *Trans.* 12.

1857 JOHN STANTON, M.D., 9, Montagu square.

1851 JAMES STARTIN, Surgeon to, and Lecturer on Cutaneous Disorders at, the Hospital for Diseases of the Skin, Blackfriars; 3, Savile row, Burlington gardens.

1858 EDWARD STEPHENS, M.D., Consulting Surgeon to the Manchester Lying-in Hospital; 58, Bridge street, Manchester.

1854 HENRY STEVENS, M.B., 78, Grosvenor street.

1842 ALEXANDER PATRICK STEWART, M.D., Physician to, and Lecturer on Medicine at, the Middlesex Hospital; 74, Grosvenor street. C. 1856-7.

1859 WILLIAM EDWARD STEWART, 12, Weymouth street, Portland place.

1856 ALONZO HENRY STOCKER, M.D., Resident Medical Superintendent of Grove Hall Lunatic Asylum, Bow.

1843 ROBERT REEVE STORKS, Paris.

1858 †JOHN FREMLYN STREATFEILD, Assistant-Surgeon to the Royal London Ophthalmic Hospital, Moorfields, and Assistant-Surgeon to the Eye Infirmary attached to University College Hospital; 15, Upper Brook street, Grosvenor square.

1839 ALEXANDER JOHN SUTHERLAND, M.D., F.R.S., Consulting Physician to St. Luke's Hospital for Lunatics, and Consulting Physician to the Royal South London Dispensary; 6, Richmond terrace, Whitehall. C. 1850-1. V.P. 1858-9. *Trans.* 1.

Elected

1860 SIGISMUND SUTRO, M.D., Senior Physician to the German Hospital; 37A, Finsbury square.

1855 JOHN MAULE SUTTON, M.D., Tenby, Pembrokeshire.

1861 *GEORGE BACON SWEETING, King's Lynn, Norfolk.

1842 JAMES SYME, F.R.S.E., Professor of Clinical Surgery in the University of Edinburgh, and Surgeon to the Edinburgh Royal Infirmary; 2, Rutland street, Edinburgh. *Trans.* 4.

1854 *FREDERICK SYMONDS, Surgeon to the Radcliffe Infirmary, and Consulting Surgeon to the Oxford Dispensary; 32, Beaumont street, Oxford.

1844 RICHARD WILLIAM TAMPLIN, Surgeon to the Royal Orthopædic Hospital; 33, Old Burlington street.

1848 THOMAS HAWKES TANNER, M.D., F.L.S., Assistant Physician for the Diseases of Women and Children to King's College Hospital; 10, Charlotte street, Bedford square.

1852 ROBERT TAYLOR, Surgeon to the Central London Ophthalmic Hospital, and to the Cripple's Home, Hill street; 10, George street, Hanover square.

1845 THOMAS TAYLOR, Lecturer on Chemistry at the Middlesex Hospital Medical School; 4, Vere street, Cavendish square.

1856 THOMAS PRIDGIN TEALE, F.L.S., Surgeon to the Leeds General Infirmary; Albion street, Leeds. *Trans.* 2.

1859 EDWARD TEGART, Junior, 49, Jermyn street, St. James's.

1845 *EVAN THOMAS, York street, Cheetham hill road, Manchester.

1857 HENRY THOMPSON, M.D., Physician to, and Lecturer on Materia Medica at, the Middlesex Hospital; 52, Welbeck street, Cavendish square.

1852 HENRY THOMPSON, Consulting Surgeon to the St. Marylebone Infirmary, and Assistant-Surgeon to University College Hospital; 16, Wimpole street, Cavendish square. *Trans.* 2.

1819 †JOHN THOMPSON, M.D., F.L.S., 18, Dalby terrace, Islington [364, City road]. C. 1833. L. 1834-7. V.P. 1850-1.

Elected

1850 ROBERT DUNDAS THOMSON, M.D., F.R.S., Physician to the Scottish Hospital, and Medical Officer of Health for St. Marylebone; 41, York terrace, Regent's park. *Trans.* 2.

1836 JOHN THURNAM, M.D., Resident Medical Superintendent of the Wilts County Asylum, Devizes, Wiltshire. *Trans.* 4.

1848 EDWARD JOHN TILT, M.D., Consulting Physician to the Farringdon General Dispensary and Lying-in Charity; 60, Grosvenor street.

1828 JAMES TORRIE, M.D., Old Bridge of Don, by Aberdeen.

1843 JOSEPH TOYNBEE, F.R.S., Aural Surgeon to, and Lecturer on Aural Surgery at, St. Mary's Hospital; Consulting Aural Surgeon to the Asylum for the Deaf and Dumb, and to the St. George's and St. James's Dispensary; 18, Savile row, Burlington gardens. *Trans.* 8. *Pro.* 1.

1850 SAMUEL JOHN TRACY, Surgeon-Dentist to St. Bartholomew's and Christ's Hospitals; 28, Old Burlington street.

1859 EDWIN THOMAS TRUMAN, Surgeon-Dentist in Ordinary to Her Majesty's Household; 23, Old Burlington street.

1855 JAMES STEWART TULLOCH, M.D., 1, Pembridge place, Bayswater.

1845 THOMAS TURNER, F.L.S., Consulting Surgeon to the Manchester Royal Infirmary, and Lecturer on Anatomy and Physiology at the Manchester Royal School of Medicine; 77, Mosley street, Manchester.

1846 ALEXANDER URE, Surgeon to, and Lecturer on Clinical Surgery at, St. Mary's Hospital, and Consulting Surgeon to the Westminster General Dispensary; 18, Upper Seymour street, Portman square. *Trans.* 1.

1806 BOWYER VAUX, Teignmouth, Devon.

1810 JAMES VOSE. *Trans.* 1.

1828 BENEDETTO VULPES, M.D., Physician to the Hospital of Aversa, and to the Hospital of Incurables, Naples.

1854 EDWARD WADDINGTON, Surgeon to the King's Own Staffordshire Rifles; Wakefield, Yorkshire.

1841 ROBERT WADE, Senior Surgeon to the Westminster General Dispensary; 68, Dean street, Soho. *Trans.* 1.

1861 *JAMES WALSH, M.R.C.P., R.N., H.M.S. Hogue, Greenock.

Elected

1852 WALTER HAYLE WALSHE, M.D., Professor of the Theory and Practice of Medicine in University College, London, and Physician to University College Hospital; Consulting Physician to the Hospital for Consumption; 37, Queen Anne street, Cavendish square. *Trans.* 1.

1851 HENRY HAYNES WALTON, Surgeon to the Central London Ophthalmic Hospital, and Surgeon to St. Mary's Hospital; 69, Brook street, Hanover square. *Trans.* 1. *Pro.* 1.

1852 DANIEL WANE, M.D., 20, Grafton street, Berkeley square.

1821 WILLIAM TILLEARD WARD.

1858 JOHN RICHARD WARDELL, M.D., 4, Belmont, Tunbridge Wells.

1846 JAMES THOMAS WARE, Consulting Surgeon to the Finsbury Dispensary, and Hon. Surgeon to the Metropolitan Convalescent Institution; 51, Russell square.

1818 JOHN WARE, Clifton, near Bristol.

1814 †MARTIN WARE, 51, Russell square. C. 1844-5. T. 1846. V.P. 1853.

1829 ELIAS TAYLOR WARRY, M.D., Yeovil, Somerset.

1837 THOMAS WATSON, M.D., F.R.S., Physician Extraordinary to H.M. the Queen; Consulting Physician to King's College Hospital; 16, Henrietta street, Cavendish square. C. 1840-1, 1852. V.P. 1845-6.

1847 *THOMAS WATSON, L.R.C.P. Edinb., Bourne road, Spalding, Lincolnshire.

1854 WILLIAM WEBB, M.D., Wirksworth, Derbyshire.

1840 WILLIAM WOODHAM WEBB, M.D., Cliff House, Kirtley, South Lowestoft, Suffolk.

1842 FREDERIC WEBER, M.D., Assistant-Physician to the Middlesex Hospital; 44, Green street, Park lane. C. 1857.

1857 HERMANN WEBER, M.D., Physician to the German Hospital 49, Finsbury square. *Trans.* 2.

1835 †JOHN WEBSTER, M.D., F.R.S., Physician to the Scottish Hospital, and Consulting Physician to the St. George's and St. James's Dispensary; 24, Brook street, Grosvenor square. C. 1843-4. V.P. 1855-6. *Trans.* 6.

Elected

1844 WILLIAM WEGG, M.D., Physician to the St. George's and St. James's Dispensary; 49, Maddox street, Hanover square. L. 1854-8. C. 1861.

1861 JOHN SOELBERG WELLS, M.D., 16, Savile row.

1854 THOMAS SPENCER WELLS, Lecturer on Surgery at the Grosvenor-place School of Anatomy and Medicine, and Surgeon to the Samaritan Free Hospital for Women and Children; 3, Upper Grosvenor street. *Trans.* 1. *Pro.* 1.

1816 SIR AUGUSTUS WEST, Knt., M.D., Deputy-Inspector of Army Hospitals to the Portuguese Forces; Paris.

1842 CHARLES WEST, M.D., Examiner in Midwifery at the University of London, and Physician to the Hospital for Sick Children; 61, Wimpole street, Cavendish square. C. 1855-6. *Trans.* 2.

1841 THOMAS WEST, M.D., Daventry, Northamptonshire.

1828 JOHN WHATLEY, M.D.

1849 JOHN WHITE.

1852 JOHN WIBLIN, Medical Inspector of Emigrants and Recruits; Southampton.

1824 *WILLIAM JOHN WICKHAM, Consulting Surgeon to the Hants County Hospital; Winchester, Hants. *Trans.* 1.

1844 FREDERIC WILDBORE, 1, Trafalgar place east, Hackney road.

1837 GEORGE AUGUSTUS FREDERICK WILKS, M.D.

1860 ARTHUR WYNN WILLIAMS, M.D., 20, King street, Portman square.

1840 CHARLES JAMES BLASIUS WILLIAMS, M.D., F.R.S., *Vice-President*, Consulting Physician to the Hospital for Consumption; 49, Upper Brook street, Grosvenor square. C. 1849-50. V. P. 1860-1.

1859 *CHARLES WILLIAMS, House-Surgeon to the Norfolk and Norwich Hospital; Norwich.

1859 JOSEPH WILLIAMS, M.D., 8, Tavistock square.

1829 ROBERT WILLIS, M.D., Barnes, Surrey. L. 1838-41.

1839 †ERASMUS WILSON, F.R.S., Consulting Surgeon to the St. Pancras Infirmary; 17, Henrietta street, Cavendish square. *Trans.* 2.

Elected

1839 JAMES ARTHUR WILSON, M.D., 28, Dover street, Piccadilly. C. 1846-7. V.P. 1858-9. *Trans.* 4.

1850 *ROBERT STANTON WISE, M.D., Consulting Physician to the Southam Eye and Ear Infirmary; Banbury, Oxfordshire.

1825 THOMAS ALEXANDER WISE, M.D., F.R.S.E., Rostellan Castle, Rostellan, County Cork.

1841 GEORGE LEIGHTON WOOD, Surgeon to the Bath General Hospital; 27, Queen square, Bath.

1851 JOHN WOOD, Assistant-Surgeon to King's College Hospital, and Demonstrator of Anatomy in King's College, London; 4, Montague street, Russell square. *Trans.* 1.

1848 WILLIAM WOOD, M.D., 54, Upper Harley street.

1843 JOHN WARD WOODFALL, M.D., Physician to the West Kent Infirmary; Maidstone, Kent.

1833 †THOMAS WORMALD, Surgeon to St. Bartholomew's Hospital, and Surgeon to the Foundling Hospital; 42, Bedford row. C. 1839. V.P. 1854.

1842 WILLIAM COLLINS WORTHINGTON, Senior Surgeon to the Lowestoft Infirmary; Lowestoft, Suffolk. *Trans.* 3.

1848 EDWARD JOHN WRIGHT, 13, Montague place, Clapham road.

1855 HENRY G. WRIGHT, M.D., Physician to the Samaritan Free Hospital for Women and Children, and to the St. Pancras Royal General Dispensary; 23, Somerset street, Portman square.

1860 JOHN WYATT, Surgeon, Coldstream Guards.

[It is particularly requested, that any change of Title, Appointment, or Residence, may be communicated to the Secretaries before the 1st of October in each year, in order that the List may be made as correct as possible.]

HONORARY FELLOWS.

(Limited to Twelve.)

Elected

1841 WILLIAM THOMAS BRANDE, D.C.L., F.R.S., Hon. Professor of Chemistry at the Royal Institution of Great Britain, Examiner in Chemistry, and Member of the Senate of the University of London; Royal Mint, Tower hill.

1835 SIR DAVID BREWSTER, K.H., D.C.L., LL.D., F.R.S., Corresp. Memb. Institute of France, Principal and Vice-Chancellor of the University of Edinburgh.

1853 BENJAMIN COLLINS BRODIE, M.A., F.R.S., Aldrichian Professor of Chemistry in the University of Oxford.

1847 EDWIN CHADWICK, late Commissioner of the Board of Health.

1835 MICHAEL FARADAY, D.C.L., F.R.S., Corresp. Memb. Institute of France, Member of the Senate of the University of London, and Fullerian Professor of Chemistry in the Royal Institution.

1857 WILLIAM FARR, M.D., D.C.L., F.R.S., General Register Office, Somerset House.

1841 SIR JOHN FREDERICK WILLIAM HERSCHEL, Bart., D.C.L., F.R.S., Corresp. Memb. Institute of France; Collingwood, near Hawkhurst, Kent.

1835 SIR WILLIAM JACKSON HOOKER, K.H., D.C.L., LL.D., F.R.S., F.L.S., Director of the Royal Botanic Gardens, Kew; West Park, Kew.

1847 RICHARD OWEN, D.C.L., LL.D., F.R.S., Corresp. Memb. Institute of France (Foreign Associate of the Academy of Sciences); Superintendent of the Natural History Departments in the British Museum; Sheen Lodge, Mortlake.

1825 The Rev. ADAM SEDGWICK, A.M., D.C.L., F.R.S., Woodwardian Professor of Geology, Cambridge.

1841 The Rev. WILLIAM WHEWELL, D.D., F.R.S., Master of Trinity College, Cambridge.

FOREIGN HONORARY FELLOWS.

(Limited to Twenty.)

Elected

1841 G. Andral, M.D., Member of the Institute and of the Imperial Academy of Medicine, Physician in Ordinary to the Emperor of the French, Professor of Pathology in the Faculty of Medicine; Paris.

1856 Baron Paul Dubois, Commander of the Legion of Honour, Member of the Imperial Academy of Medicine, Dean of, and Professor of Clinical Midwifery in, the Faculty of Medicine; Paris.

1835 Carl Johan Ekströmer, M.D., C.M., K.P.S., and W., Physician to the King of Sweden, President of the College of Health, and Director-General of Hospitals; Stockholm.

1841 Christian Gottfried Ehrenberg, Member of the Institute of France; Berlin.

1859 J. Henle, M.D., Professor of Anatomy at Göttingen.

1841 James Jackson, M.D., LL.D., Emeritus Professor of Medicine in the Harvard University, Boston, U.S.

1856 Bernhard Langenbeck, M.D., Professor of Surgery in the University of Berlin.

1843 Baron Justus von Liebig, M.D., Foreign Associate of the Academy of Sciences, Conservator of the Royal Collection, and Professor of Chemistry in the University of Munich.

1841 P. C. A. Louis, M.D., Honorary Physician to the Hôtel-Dieu, Member of the Imperial Academy of Medicine; Paris.

1847 Carlo Matteucci, Professor in the University of Pisa, Member of the Institute of France.

1853 Valentine Mott, M.D., LL.D., Emeritus Professor of Surgery in the University of New York, late President of the New York Academy of Medicine; New York.

1841 Bartolomeo Panizza, M.D., Pavia.

Elected

1859 PIERRE RAYER, M.D., Commander of the Legion of Honour, Member of the Institute, and of the Imperial Academy of Medicine; Paris.

1850 CARL ROKITANSKY, M.D., Curator of the Imperial Pathological Museum, and Professor at the University of Vienna.

1856 LOUIS STROMEYER, M.D., Director-General of the Medical Department of the Army of Hanover; Hanover.

1856 A. VELPEAU, Member of the Institute, and of the Imperial Academy of Medicine, Professor in the Faculty of Medicine, Surgeon to the "Hôpital de la Charité;" Paris.

1856 RUDOLPH VIRCHOW, M.D., Professor of Pathological Anatomy in the University of Berlin.

1859 W. VROLIK, M.D., Professor of Natural History at Amsterdam.

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A CASE

OF

GASTROTOMY

FOR

EXTRA-UTERINE GESTATION.

BY

JOHN ADAMS, F.R.C.S.,

SURGEON TO THE LONDON HOSPITAL.

Received Sept. 29th.—Read Nov. 13th, 1860.

In the early part of the spring of 1860, I was requested by Dr. Ramsbotham to see a patient in the London Hospital with a large swelling in the abdomen, which he considered to be an extra-uterine fœtus; and the history of the case led me to the same opinion.

Mary Jermy, æt. 28, of fair complexion and middle height, and with all the appearances of good health, had been married eight years. She had always menstruated at regular periods, but had never been pregnant before. In January, 1859, she menstruated very profusely, and very scantily in February; from March until May she was subject to occasional attacks of severe cramp-like pains, which were confined to the right side of the abdomen, extending from the pelvis to the hypochondrium: she felt very sick, but rarely vomited: she had no distinct morning sickness at any time. After February her menstrual secretion stopped, and she dated the commencement of her pregnancy from the early part of this month. In June

she first felt the movements of a child, and her breasts perceptibly enlarged. This condition continued, and, after some time, she observed milk escaping from both breasts, more particularly the left; and the veins of the left leg and thigh became varicose.

She continued in good health, her abdomen increased in size, and she distinctly felt the movements of the child, until the 30th of October, a day or two prior to which she had a heavy fall, which was followed by soreness and cramp down to her knees. She considered herself in the ninth month of her pregnancy, and expected her confinement in the early part of November. She was visited by Mr. Williams, surgeon, of Plaistow, Essex, who was engaged to attend her. On the 30th of October she received a severe mental shock from her sister's death. At this time she ceased entirely to feel the movements of the child; and a week after this, she began to feel sleepy, tired, and worn, and suffered from a sense of stiffness in her limbs, but had no distinct pains like uterine pains. A discharge took place from the vagina, and blood, varying in colour from dark to pink, and pieces of flesh-like substance, entirely inoffensive in odour, were expelled in gushes. She reckoned her time of gestation to have terminated at the beginning of November. From this time she gradually diminished in size.

In January, 1860, she remained in much the same state. In February menstruation recommenced; and it has continued regularly ever since, varying in quantity, and usually expelled in gushes. The milk remained in her breasts until the following March, when I first saw her. Latterly she had become much thinner than she was.

On examination a hard oval tumour was felt, principally on the right side of the abdomen, extending from above the umbilicus to the right side of the symphysis pubis. There was a remarkable prominence in the tumour, which was quite immoveable, and very unlike any swelling from a fibrous tumour connected with the uterus. The hand could be readily passed around a great part of it, and the

abdominal parietes could be made to glide indistinctly over its anterior surface. There was a feeling of irregularity about it; but I confess I could not distinctly recognise the individual portions of a fœtus, for there was a good deal of subcutaneous fat in the walls of the abdomen. From my limited experience, I can hardly venture to assert that the sensation communicated to me by the examination was characteristic of this condition, but I recognised it at once as precisely similar to what I had once witnessed in a parallel case. There was no pain on pressure. The uterus was found by examination *per vaginam* to be rather higher than usual, but there was no evidence of disease in it. She was able to perform her usual domestic duties, and expressed herself very anxious for the removal of the tumour.

There could be little or no doubt as to the precise nature of this case, and Dr. Ramsbotham and I agreed that the operation of gastrotomy should be performed; but we thought it prudent, on grounds hereafter to be stated, that this should be deferred until six months had elapsed from the end of what was supposed to be her natural gestation. She was readmitted in May, and, being then in perfect health, and fully alive to the risk of the operation, I performed the operation on the 31st. She was readily placed under the influence of chloroform. I made an incision about five inches in length in a vertical direction over the most prominent part of the tumour, beginning a little above and on the right side of the umbilicus, and extending as far as within an inch and a half of the pubis. The integuments were divided, and I found that my incision had fallen on the sheath of the rectus. This was opened, and the muscle exposed; the peritoneum was opened to the same extent, and the surface of the tumour came into view, presenting a glistening aspect, and only slightly adherent at this part. The cyst, which was about four lines in thickness, and very firm, was opened, and a pint of a greenish-yellow, transparent fluid escaped, with yellowish flakes of *vernix caseosa* and some hairs. As soon as the cyst was opened, a loop of the funis protruded. The

cyst was divided on the finger to the extent of the opening in the abdomen, and the funis being returned, and a portion of the rectus divided transversely, I felt the head and body of a fœtus, with its head uppermost, and its face towards the spine. I introduced my hand and seized an arm, which I pushed back, and then had no difficulty, owing to its limp state, in extracting the fœtus by the breech. The funis was divided so as to leave about two inches outside the incision. On traction by the remaining portion of the funis, it was clearly ascertained that the placenta was firmly adherent, and, under the advice of Dr. Ramsbotham, no attempts were made to remove it. A piece of omentum, which had escaped through the opening, was cut away, and some rather large arteries, as well as some vessels in the cut edges of the cyst, were secured. I carefully sponged out all the fluid from the cyst, the walls of which collapsed, especially on the left side. Firm adhesions seemed to keep the right side in contact with the abdominal walls. The edges of the wound were carefully brought together by interrupted sutures, carried only through the integument and subjacent fat, and all the parts were kept in apposition by careful strapping, padding with cotton wool, and an elastic bandage.

Half a drachm of laudanum was given after the operation. She became exceedingly faint, but was restored at once by brandy. It would be useless to detail her progress with any degree of minuteness from day to day. She took moderate support, and a small quantity of brandy and good sherry, and she went on uninterruptedly well. The funis, which, on its first appearance during the operation, was thick and œdematous, shrivelled up, and was altogether lost sight of on the fifth day after the operation; no doubt it escaped amongst the discharges. There remained for some time a small fistulous opening, with exuberant granulations, and a slight discharge of fetid matter at the lower part of the wound, where the funis had escaped.

October 1st.—Since this account was written, I have seen Mrs. Jermy three times. On her first visit she looked

pale and ill, her legs were slightly swollen, and her general health was evidently suffering from some obscure cause. The fistulous opening still existed, and discharged a small quantity of fetid pus. I passed a steel director at least four inches towards the back of the pelvis, and this gave her pain. Caustic was applied to the orifice. Ten days or a fortnight after this she came to see me, and her health had materially improved; and about ten days ago she appeared quite well, and told me that the discharge had almost entirely ceased.

I subjoin an account of the fœtus kindly sent me by Dr. Bader, the talented sub-curator of the Royal College of Surgeons.

October 2nd, 1860.—The length of the child from the top of the head to the soles of the feet was two feet; from the same point to the umbilicus ten and a half inches. The brain weighed three and a half ounces; the lungs one and a quarter ounce; the heart half an ounce; the liver one and a half ounce; the spleen one scruple; the intestines three ounces; weight of the child four pounds three ounces. The urachus and umbilical vessels were open. The lungs were pale, and floated freely. There was some yellow transparent fluid in the heart, together with several clots of pale-brown blood. The brain had a fleshy, red colour; its convolutions were developed; it had a smeary consistence. There was a great deal of meconium in the intestines. The child was a female, well developed. The cuticle peeled off in large flakes. There was no offensive odour. The head was well covered with fine, long, and light-brown hair. The nails were long and well developed. The parietal bones were slightly displaced, and overlapped by the occipital and frontal bones. Both corneæ were opaque; the eyes shrunk: no vitreous humour was found.

No opportunity was afforded in this case of proving the precise situation of the extra-uterine fœtus; and whether it was developed in the walls of the uterus or in the abdominal cavity by attachment of the ovum to the peritoneal

surface of the intestines, could not be made out; and, I need not say, this was not attempted. There are points, however, of serious importance in connection with this case, on which the practice pursued has a forcible bearing: these are, first, the propriety of performing any operation whatever under such circumstances; secondly, the time at which the operation should be performed, if thought desirable; and lastly, the method of performing it.

Are we justified in removing by operation an extra-uterine fœtus, when nature affords us no indication of a desire to get rid of it by ulceration, pointing, &c.? The question resolves itself into this—Is the risk incurred by the operation commensurate with that which the woman runs, if the case is allowed to remain intact? Let us first inquire what the risk is which is incurred by a female under such circumstances. Placing entirely out of consideration the propriety of non-interference during the evolution of the fœtus, when it is quite clear that no operation is justifiable, as all attempts to save the life of the child have been invariably fatal to the mother, is the chance that the fœtus may remain innocuous for an indefinite period to be weighed in the balance in favour of non-interference? I think it may, because there are on record a sufficient number of facts to influence the result. Many such cases are found compiled in Dr. William Campbell's excellent memoir on extra-uterine gestation, published in 1840. He mentions nineteen cases in which the fœtus remained in the abdomen of the mother during a period varying from ten to fifty-six years; and he refers to seven cases in which the mothers so circumstanced conceived once, two cases in which the mothers bore two children, four cases in which three children were born, two instances of five births, and one case where the mother gave birth to six children, whilst an extra-uterine fœtus remained in her abdomen. He makes, however, this judicious remark:—"Except in some rare cases, sooner or later, in consequence of many causes, which may or not be obvious, inflammation arises in the adjoining organs, involving the envelope of the fœtus."

Such cases may fairly enter into our calculation in considering the propriety of operating, and they rather militate against any surgical interference during the quiescent state of the structures involved; but too much importance ought not to be attached to them.

In those cases which have remained innocent for so long a time, nature converts the cyst containing the fœtus into a material not readily acted on, which constitutes a permanent covering, as in the well-known case recorded by Mr. Lawrence, in the fifth volume of the 'Transactions' of this Society. The preparation is in the Pathological collection of the museum of the College of Surgeons, and is numbered 1722. In this instance calcification of the original cyst took place, and a bony case was formed around the fœtus, which remained innocuous for fifty-two years, the woman dying of a disease quite irrespective of the original condition. Or the fœtus undergoes a sort of petrifaction, by which it is converted into cartilage or bone, and is materially reduced in volume. Instances of this are referred to by Dr. Campbell.

Numerous instances are on record where the fœtus has been got rid of by ulceration into the vagina, rectum, colon, bladder, as well as by abscess opening externally either at the umbilicus or some other part of the abdominal walls. It is most probable that, in all such cases, the decomposition and subsequent disintegration of the fœtus have preceded the efforts of nature to evacuate the contents of the cyst; for when the fœtus has been extracted entire, however long a period may have elapsed after the termination of natural gestation, no decided evidences of putrefaction have been found. In a case quoted by Dr. Ramsbotham ('Principles and Practice of Obstetric Surgery'), where a fœtus was removed by incision, which had evidently remained eight years in the abdomen of the mother, it was in "an astonishing state of preservation." The case is given in the 'Medico-Chirurgical Review' for 1834. A fistulous opening was formed at the umbilicus, which was enlarged, and the fœtus was removed. In the case, also, the subject of the

present paper, there were no decided evidences of putrefaction of the fœtus. It cannot for a moment be questioned that, where ulceration has indicated the point at which the fœtus may be extracted, the removal, by surgical aid, may be accomplished generally with safety, and sometimes even with celerity; it nevertheless happens frequently that the mother dies a miserable death, being worn out by the constant discharge and low hectic fever. I have seen but two instances of extra-uterine gestation: one is the case now under consideration, and another I witnessed in consultation with Dr. Ramsbotham and Mr. Kennedy, of Stratford. In the latter case it was determined to wait until nature gave some indication, by pointing or by abscess, of her desire to evacuate the fœtus; but at the very time when surgical interference was obviously called for, the patient declined any operation, and she sunk miserably, worn out by hectic and diarrhœa. I regretted that, in this case, I had not at an earlier period of the treatment advised the operation; for in consequence of the formation of a fluctuating tumour near the umbilicus, I was induced to introduce a trochar, and drew off a few ounces of serum: it is not improbable that this was really the indication I might have anticipated.

We have then, as militating against the operation of primary gastrotomy, the fact that the fœtus may remain innocuous for an indefinite period, and next that nature may expel the fœtus by abscess or ulceration, at which time the surgeon's assistance may be frequently advantageously employed: in respect to the first, however, there is the prospect that, sooner or later, inflammation and its consequences may arise; and, in reference to the second, many mothers die during the efforts of nature to get rid of the incumbrance. Nevertheless, arguments deduced from a consideration of these circumstances might deter a timid surgeon from any interference, except under circumstances now so frequently mentioned; and it is quite clear that, if the spot where the incision should be made were always indicated, it would obviously be our duty to wait until this

took place; but it must be admitted that frequently ulceration occurs in parts where it cannot at first be recognised, and where no surgical means can be employed to aid nature in her efforts.

The question which I propose for the consideration of the Society is—Are we justified in performing gastrotomy before nature affords us any indication of an attempt on her part to expel an extra-uterine fœtus? It is quite evident from recorded facts, that any attempt to remove a living child is invariably attended with a result fatal to the mother; and it is evident that no operation is justifiable until the fœtus has become so far evolved that, from the situation, size, and character of the tumour, with an unimpeachable history from the mother, strengthened, if possible, by that of her medical attendant, not the slightest doubt can exist of its true character.

On this subject surgery affords us scarcely a sufficient number of facts to warrant a decided judgment. But are we to withhold an opinion on this ground, and to decline an operation because we have no statistical proof of its success? Certainly not, for this would at once strike at the root of all improvements in operative surgery. Let us look at the circumstances of the case, as afforded by this and other analogous instances. The fœtus is dead, and must sooner or later be felt as a foreign body, according to a natural law: if the operation by incision at an early period be not adopted, it must either be removed by the slow process of ulceration, or it must be so closed in as to be incapable of becoming a cause of further annoyance, except from its size and position. Of course, I am not anxious to evade the fact that gastrotomy may be successfully performed after ulceration has commenced. But the pointing may occur, as is often the case, in situations where no operation can be performed. I think that, even when no pointing has happened, as a foreign body it ought to be removed. So long, however, as it gives no inconvenience, the decision may rest entirely with the patient; but I certainly would not withhold my sanction to the operation, if she herself, on account

of pain or other cause, were willing to rid herself of her burden.

To me there appear to be two circumstances of importance to be considered in regard to the question of primary gastrotomy, I mean where the operation is performed prior to pointing; namely, the period of evolution of the fœtus, and the time at which the operation may be performed most safely after the termination of the life of the fœtus. It is most probable that the older the fœtus, or the nearer it has approached to maturity, the greater the chance of a successful result by primary operation; and, further, that within some limits, indefinite I admit, the longer the operation is deferred the better. But I refer both these circumstances to one and the same head, namely, the probability of adhesion having taken place between the cyst and the walls of the abdomen, so as to obviate one cause of danger—the risk of peritonitis.

In the case just related, the woman had begun to suffer uneasiness in the tumour, and was anxious that the fœtus should be removed. Dr. Ramsbotham and I adopted the hint, but advised her to wait until six months had elapsed from the completion of her full period, at which time I anticipated a complete adhesion of the cyst to the peritoneum; in this I was to a certain extent disappointed. The operation was performed on the 31st of May, rather more than the six months, as it became necessary to await the termination of her catamenial period.

The only circumstance in connection with the operation requiring particular remarks—and I believe the observation refers to almost all cases of gastrotomy for extra-uterine gestation—relates to the placenta. From the few recorded cases of the operation, it appears that wherever any rude attempts have been made to extract the placenta, the cases have invariably been fatal. Nevertheless, it ought to be examined by very gentle traction of the funis, to see if it is loose, and can be removed with facility, otherwise it is better to leave it alone, with the hope that it will be separated and come away in the discharge; for while it remains,

the wound will not close, and there is no doubt that the patient incurs the risk of pyæmia so long as the wound remains open.

Dr. Barnes, in the quarterly report on midwifery, contained in the fifty-second volume of the 'British and Foreign Medico-Chirurgical Review,' quotes a case of extra-uterine gestation operated on by Dr. Goodbrake, of Clinton, Illinois, United States, which terminated fatally. The case was that of a lady, forty-three years old, the mother of nine children, the youngest before her last pregnancy being about six years old. She became again pregnant, and was disappointed in the expectation of her confinement at the end of her full period. The tumour was on the right side, extending from above the umbilicus to the iliac fossa; it felt hard and irregular. There were other co-existent signs of pregnancy, which rendered the nature of the case quite clear. The patient was anxious to have an operation performed to get rid of the fœtus; this was done exactly two years and nine months from the end of her full period. The sac was traced to the right iliac fossa, to which, and to a considerable extent of the parietal peritoneum on the right side, it was firmly adherent. There were no adhesions anteriorly, nor to the intestines. A small incision was made into the sac, and a fœtus was found in a good state of preservation. The cord was still attached to a very small placenta, of a cartilaginous character, seated low down in the pelvis, and immediately over the space where the sac was adherent to the broad ligament. *The cord, and as much of the placenta and sac as could be got away without lacerating the peritoneum, were removed,* the parts carefully sponged, and the incision brought together by the interrupted suture. The patient died on the fifth day, from prostration. I cannot conceive this violent procedure to be justifiable.

Postscript.—May 30th, 1861.—The wound, in the case of Mary Jermy, closed up at least four months ago; but she has suffered from a large ventral hernia, which is easily reduced, and is readily retained by a suitable truss.

ON AN OPERATION

FOR

PERVIOUS URACHUS,

WITH STILLICIDIUM URINÆ.

BY

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COMMUNICATED BY

WILLIAM BOWMAN, F.R.S.

Received Dec. 11th, 1860.—Read Jan. 22nd, 1861.

The thirty-third volume of the 'Transactions' of the Royal Medical and Chirurgical Society contains a case in which, by the finger passed into the bladder through the navel, and along the urachus, which had remained open from birth, I had extracted a ring-shaped calculus, formed on a pubic hair as its nucleus.

I have since accomplished perfect closure in this and another case of the same congenital defect; and though the operation by which it has been effected is, perhaps, an obvious one, certainly simple in principle and easy of execution, the cases, too, extremely rare, yet the disgust excited by a continual escape of urine, and the wretchedness of life thus entailed by the malformation, seem to render a notice of its readiness of cure worthy of record.

The case first operated on for open urachus was introduced to me by Mr. Spencer Edmonds, of Appleby, in this county, who wrote that he had in his practice a female infant, little more than four months old, in whom an escape

of urine at the umbilicus was keeping its clothing in a constant state of soak; and that the grievous anxiety of the parents of the child had been much increased by hearing that two metropolitan surgeons of extended experience and unquestionable science, who had been applied to, had never known such a case, and could not suggest anything for it.

The age of the little patient, and the expectation of help from the nisus formativus, stimulated by nature's love of perfect works, strongly impelled me to wish to try a course which had suggested itself in the other case after extraction of the stone through the umbilicus, but which was declined on account of the age of the man and the responsibility attending the operation, when he had so long lived a healthy and useful, though a miserable life. In the present case there was no such responsibility, and hope was more buoyant. I therefore proposed the paring of the edges of the umbilical opening, and their adaptation by a suture-pin and lint. This was promptly acceded to by Mr. Edmonds and the parents, and the child was brought for the purpose.

June 29th, 1858.—I find that, on drawing asunder the folds of the umbilicus by the fingers, an aperture is seen which would admit a common-sized cedar pencil. The skin is inverted, and proceeds along the opening to the level of the posterior surface of the abdominal parietes, where it meets the mucous membrane of the bladder extended along the urachus. Every occasion of thus drawing the skin is accompanied by a gush of urine. The child is well developed, thriving, and lively.

The operation is simply to seize with toothed forceps the integuments at the juncture of the skin and mucous membrane, and hold them while free decortication of the whole circumference of the aperture is made with a small scalpel. Adaptation is effected by a suture-pin and a strip of lint wound on it, as for harelip, first in an 8 form, then elliptically, until sufficient breadth of pressure is given.

A thin, flexible catheter, an inch and a half long, is confined in the bladder.

30th.—The child has been very restless, and screamed

much, which state opium has not been able to control. Bloody urine has escaped by the side of the catheter, but none through it, nor at the umbilicus, which is free from swelling and redness. The catheter is taken out, and found plugged with mucus.

July 6th.—Almost immediately after the removal of the catheter, the child ceased to cry, and micturated naturally, and it has gone on well. On the third day the pin was withdrawn, the lint still adhering; this, however, was washed away within twenty-four hours by urine, which again escaped, though in a very small stream. To-day, on separating the plicæ of the umbilicus, the aperture is found scarcely large enough to admit the bulb of a probe, and in a granulating state.

At this point the patient returned into the country to await the result, and return for future operation, if necessary. In about three weeks, however, I heard from Mr. Edmonds that "for the last ten days no escape of urine had taken place." Again January 3rd, 1859, he writes:—"I am very glad to inform you that the infant upon whom you operated for open urachus continues perfectly well. To support a slight umbilical protrusion, she still wears an elastic belt." On June 30th, 1860, he again says:—"The protrusion is certainly less; the child very strong and hearty."

The satisfactory issue of the preceding operation induced me to recommend it to John Conquest, the subject of the ring-shaped calculus, before alluded to as being reported in the thirty-third volume of the Society's 'Transactions;' and after long hesitation he enters the Infirmary, May 22nd, 1860, now fifty-five years old. The subsequent operation was done with the approval and aid of my colleagues, Mr. Macaulay and Mr. Benfield.

The hernial protrusion, and other points of his case, remain as previously described (vol. xxxiii, p. 294). The opening in the linea alba is elliptical, and admits three fingers in its longer axis, which is horizontal, and two in its vertical.

May 24th.—During the state of chloroform excitement, his struggles produced a hernial tumour, larger than a man's

fist, sonorous on percussion, and therefore containing intestine; its surface was formed of mucous membrane.

After passing the finger to ascertain that no calculus was again in the bladder (for I have extracted a second—this time of disc shape—since the one previously reported), the operation was proceeded with. It was a repetition of that on the child, except that the decortication was here carried to the extent of the third of an inch in thickness, and two thirds in breadth; also, three common curved needles were used instead of straight pins, for the sake of the deeper hold the curve would take of the parietes without strain. A catheter was introduced and fixed.

25th and 26th.—No complaint; blood deeply tinges the urine, and settles as a purple syrup in the chamber-pot.

27th.—Had a rigor this morning. The urine to-day deposits a glairy mucus, scarcely coloured; no escape at the wound. Catheter removed.

29th.—Needles removed; the opening effectually closed. A pad of lint and oiled silk applied, with a bandage round the body.

June 1st.—Urine quite clear; allowed to get up.

19th.—Discharged; cicatrization perfect for the last few days.

In September a slight orchitis brought the man to me, and gave me an opportunity of ascertaining that the umbilical tumour, in its peripheral extent, was bounded by the opening in the tendinous sheet of the linea alba, and protruded to the size of half a hen's egg. These dimensions are not now increased by any exertion, nor does the tumour yield any sound on percussion. In short, the protrusion is entirely vesical, or rather urachous, and the closed front affords sufficient support to enable the posterior layer to resist any intestinal hernia.

In the first of these operations the catheter was entirely useless; in the second the necessity for it may be doubted; should a third case offer itself, I shall be satisfied with the use of the catheter only when it is indicated.

Rokitansky (p. 219, vol. ii, of the Sydenham Society's

edition) says: — "The urachus may remain patent to a certain distance, or throughout its entire extent."

Cruveilhier ('Library of Medicine,' edited by Dr. Tweedie, vol. vii, p. 592) has the following notice:—"In new-born infants, and even in adults, the urine has been seen to escape at the umbilicus; but in these cases the urethra is always obliterated."

The 'Medicinische Zeitung,' of Berlin, No. 19, 1837, contains the case of an infant, of about four weeks old, in whom a copious discharge of urine was taking place at the navel. A hernia projected about three quarters of an inch, and an excoriated spot, a quarter of an inch long and one line broad, showed on its surface several points at which the urine was issuing. The report further says, the excretion of urine took place in a normal manner from the urethra.

The Berlin case shows another form in which the urachus may remain pervious; but both it and the two here reported satisfactorily disprove that "in these cases the urethra is always obliterated." They equally prove that the disgusting effect of the congenital malformation may be readily and permanently obviated.

CONTRIBUTIONS

TO THE

SUBJECT OF COMPOUND FRACTURE;

BEING AN

ANALYSIS OF 302 CASES.

BY

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Received Dec. 13th, 1860—Read Feb. 12th, 1861.

Recognising the truth that the science of medicine and surgery is one purely of observation, and that its principles and practice can only be regarded as sound, so long as they are based on the facts deduced from recorded and carefully observed phenomena, I cannot doubt that it is the duty of every practitioner to communicate to his professional brethren any positive material he may possess, and thus to add his quota towards building up the noble art and science to which we have the honour to belong. In conformity with this acknowledged principle, I have now the pleasure of presenting a brief analysis of upwards of 300 cases of compound fracture of the extremities. I have omitted those minor examples in which the smaller bones of the hands and feet were involved, and I believe that the results educed are not unfruitful either of interest or instruction.

The cases have all occurred in Guy's Hospital during the last twenty years; my own notes have furnished me with

the particulars of all admitted within its walls during the last seven years, while the earlier cases have been collected from the records of the institution.

Analysis of the whole number.

Of the whole number of 302 cases—

17, or 5·6 per cent., were of the thigh.
193, or 63·9 „ „ leg.
35, or 11·5 „ „ arm.
57, or 18·8 „ „ forearm.

Eleven out of the 17 cases of compound fracture of the *thigh* proved fatal, or 64·7 per cent.

Seventy-four of the 193 examples of compound fracture of the *leg* were fatal, or 38·3 per cent.

Four out of the 35 cases of compound fracture of the *arm* died, or 11·4 per cent. And—

Seven, or 12·2 per cent., of the 57 cases of compound fracture of the *forearm*.

Of the whole number of 302 cases, 96 were fatal, or 31·7 per cent.

The causes of death in these 96 cases will be seen in the following table:

Table showing the causes of Death.

Causes.	Cases operated on.		Cases not operated on.		Total.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Exhaustion	27	50·	12	28·5	39	40·6
Gangrene	5	9·2	6	14·2	11	11·4
Pyæmia	15	27·7	6	14·2	21	21·8
Delirium tremens	2	3·7	7	16·6	9	9·3
Bronchitis	1	1·9	3	7·1	4	4·1
Tetanus	—	—	2	4·7	2	2·
Secondary hæmorrhage	—	—	1	2·4	1	1·
Internal complications	4	7·4	3	7·1	7	7·3
Erysipelas	—	—	1	2·4	1	1·
Cause unknown	—	—	1	2·4	1	1·
Total	54	99·9	42	99·6	96	99·5

It would thus appear that, in cases subjected to amputation, pyæmia was twice as fatal as in those treated without that operation, and that exhaustion and gangrene are more common causes of death.

On the other hand, it would appear that in cases treated on ordinary surgical conservative principles, delirium tremens and tetanus are more common causes of a fatal result.

Bronchitis may, perhaps, be considered only as an accidental complication, and need not, therefore, be taken into the account.

Analysis of the cases of Compound Fracture of the Thigh.

Among the seventeen examples of compound fracture of the thigh—

9 underwent primary amputation	6 died, and	3 recovered.
1 „ secondary „	1 „	—
7 were treated on conservative principles	4 „	3 „

Thus, 10 were treated by amputation, and 7 of these died, or 70 per cent.

Seven were left to nature's efforts for repair, and of these 4 died, or 57 per cent.

One of these latter patients, a man aged twenty-seven, in whom no operation was called for, sank two hours after the injury. A second, aged thirty-two, died on the eighth day from tetanus. Another, aged fifty, sank exhausted from profuse discharge on the twenty-eighth day; and lastly, a man, aged fifty, died in the fifth month, from erysipelas coming on during the convalescence after hectic and free suppuration.

Amongst the cases proving *fatal after amputation*, one survived the operation but thirty-six hours. Two died on the third day, and one on the fourth, sixth, eighth, and fiftieth day, respectively. All died from simple exhaustion, the result of the accident, operation, or purulent discharge.

Remarks.—The *rarity* of compound fracture of the thigh

is a point worthy of notice, this accident bearing the proportion of only 5·6 per cent. to other cases involving the larger bones of the extremities. This fact is one which every surgeon in civil practice must be well prepared for, and that I should only have been able to collect seventeen examples of such an accident can therefore be no subject of surprise.

The *excessive mortality* of these cases is another point for observation, 64 per cent. of the whole number proving fatal.

In nearly 60 per cent. amputation was had recourse to, and 70 per cent. of these cases subsequently sank. The extreme severity of the injury in the majority of these instances rendered primary amputation absolutely essential, and the depression caused by the accident, operation, and secondary suppuration, proved too much for the patients' powers, death resulting in the large proportion above indicated.

Amongst the examples in which attempts were made to save the limb, more than half, or 57 per cent., subsequently died; two of the remaining successful cases were in boys aged twelve and fourteen years respectively, and the third was in a man aged thirty-two. In all three instances a good limb was the result.

When the experience of other men, and more particularly of military surgeons, is referred to, such a result is by no means a common one.

Dupuytren, Hennen, Larrey, Guthrie, and others, all agree that, in compound fracture of the thigh from gunshot wounds, "in rejecting amputation we lose more lives than we save limbs;" and also, "that in the *exceptional cases* which result in consolidation, the condition of the limb is not encouraging."

Macleod, after the result of his Crimean experience, advises amputation *in all* such cases when the fracture takes place in the middle and lower third of the thigh; and he hesitates only as to a like recommendation in cases of fracture of the upper third, on account of the extreme mortality of such amputations.

Malgaigne lost three out of five cases which were selected for conservative treatment. Baudens, out of twenty-five examples thus treated, saved only two, and these retained deformed members, unfit to fulfil their functions.

The limited experience which any single civil surgeon can bring to bear on this subject must be regarded as nothing when compared with that of his military brethren; but it would appear as a tolerably general conclusion that a satisfactory result can rarely be obtained, except in the most favorable cases, that is, when the subjects are young and the fracture uncomplicated, when the soft parts are neither materially damaged nor the bone comminuted.

In the case of a man which I have now under my care, and which is not included in my table, a limb has certainly been saved, but that is all; and it is a great question in my mind whether it can ever be a serviceable one. Months of delay, attended with profuse discharge and the occasional removal of dead bone, have passed away, and a deformed and ugly limb is the result. Often have I regretted that I had not long ago performed amputation, although, from other injuries complicating the case, primary amputation would not have been advisable.

We may, then, fairly conclude that in a non-comminuted fracture of the femur, made compound by a clean wound communicating with it, and taking place in a young and healthy subject, conservative treatment may be expected to prove successful. But when the bone is comminuted and the soft parts are seriously involved—a condition existing when the mechanical violence producing the accident has been great—a satisfactory termination of the case must be regarded with doubt. If the patient is old or unhealthy, and the local injury forbids any expectation of a natural recovery, amputation should be resorted to; and if the surgeon is disposed to doubt which practice he should adopt, I am tempted to believe that the removal of the limb is the safest and soundest practice. But if the subject of the injury should be healthy, and he is not subjected to injurious hygienic influences, and if the *broken and*

disconnected fragments of bone be at once removed, the wound being enlarged, if necessary, and absolute repose maintained, it is not unfair to believe that a satisfactory termination of the case may be obtained.

To leave the broken fragments in their position, with the hope of union, is but to leave a constant source of irritation, which must retard the local process of reparation as well as seriously weaken the powers of the patient. It is better practice to proceed at once to the removal of the offending and irritating osseous fragments than to leave them. They can but do harm by their presence, and at a later period their removal by a secondary operation will be a necessity.

Analysis of the 193 *cases of Compound Fracture of the Leg.*

In this number are included examples of compound fracture of the tibia and fibula; very few, however, of the latter bone alone have been tabulated; indeed, I possess the account of but one case, the result of a direct injury. I am not disposed to maintain that other instances may not have been recorded in my tables; but of this there is no doubt, that it is a rare form of accident, and fortunately not of a very serious nature.

The remainder of the examples which I possess are of fracture of the tibia alone, or of both tibia and fibula combined, the latter being by far the most frequent.

Amongst the 193 examples of compound fracture of the leg are—

							Per cent.
129	treated on conservative principles				35	of which died, or	27·13
32	underwent primary amputation		of leg,	19	„		59·37
11	„		„	thigh, 6	„		55·55
15	„	secondary	„	leg, 10	„		66·66
6	„	„	„	thigh, 4	„		66·66

74 of the whole number died, or 38·34 per cent.

27·13 per cent. of those treated without amputation died, and 60·9 per cent. of those in whom that operation was performed.

It is true that no comparison can be drawn between these two classes of cases, as the injuries for which amputation was performed were necessarily of a more severe nature than those which were treated by ordinary surgical appliances. Each case of compound fracture has peculiarities of its own, requiring its own special treatment.

It may be observed that, out of the whole number of cases—

16·5 per cent. were treated by primary amputation of the leg.
5·7 „ „ „ „ thigh.
7·7 „ „ secondary „ leg.
3·1 „ „ „ „ thigh.
66·8 „ „ on conservative principles, and of these 27·13 per cent. proved fatal, or rather more than one case in four.

Of those treated by amputation 60 per cent. proved fatal, the secondary amputations being the least favorable.

Every surgeon's experience will tell him of the comparative frequency of such an accident as compound fracture of the bones of the leg, and my tables plainly exhibit the fact that about 65 per cent. of all cases are of such a nature. Compound fracture of the fibula is by no means a common accident, and when it occurs a direct blow is its usual cause.

The causes of death in the fatal cases of compound fracture of the leg may be seen in the following table:

Causes.	Cases operated on.				Total.	Per cent.	Cases treated without operation.	
	Primary.		Secondary.				Total.	Per cent.
	Thigh.	Leg.	Thigh.	Leg.				
Exhaustion	3	9	4	3	19	29·7	10	7·7
Gangrene	—	1	—	3	4	6·2	6	4·6
Pyæmia	3	6	—	3	12	18·7	6	4·6
Delirium tremens	—	1	—	—	1	1·5	7	5·4
Bronchitis	—	1	—	—	1	1·5	3	2·3
Tetanus	—	—	—	—	—	—	1	·7
Secondary hæmorrhage	—	—	—	—	—	—	1	·7
Internal complications	—	1	—	1	2	3·1	—	—
Cause unknown	—	—	—	—	—	—	1	·7
	6	19	4	10	39	60·7	35	26·7

It will appear, then, from the above table, that about one third of the cases operated upon die from pyæmia, and nearly two thirds from exhaustion or gangrene; and that of the cases treated on conservative principles, not one sixth die from pyæmia, and something less than half from exhaustion and gangrene. Delirium tremens, however, is more fatal.

Cases of the former class are apparently more liable to pyæmia than the latter, and exhaustion and gangrene are more fatal in them.

It has already been observed that no comparison can be drawn between the two classes of cases—the one treated with amputation, and the other without it; but in compound fracture of the leg the injury should be very extensive to warrant such a practice as amputation. Whether treated by primary or secondary amputation, a large proportion of the cases terminate fatally—about 60 per cent.; and when attempts to save the limb are carried out, by care and close attention good results may be anticipated.

Let a free exit be made and kept up for the evacuation of all pus, let loose pieces of bone be removed *as early as possible*, and let the limb be preserved in absolute repose by any splint which will secure such an end, the ordinary interrupted splint being placed over the wound. Let the tendo Achillis be divided if the slightest difficulty is experienced in maintaining rest, and good support and nourishment be freely given. Under such treatment apparently hopeless cases often turn out well, and reward the surgeon's attention by a successful result.

If such means fail, secondary amputation may be resorted to; for the chance of success by such a measure is nearly as favorable as if a primary amputation had been performed. In several very bad examples which have passed under my observation, and in which success was subsequently secured, free incisions were made wherever pus was present, and I am disposed to believe that such a practice tended much to secure this desirable end. By such treatment all burrowing is prevented, and constitutional dis-

turbance lessened; it is a practice which I have never seen followed by any other than a good result, and I would suggest its more frequent adoption whenever suppuration follows compound fracture.

Analysis of the 35 *cases of Compound Fracture of the Arm.*

14 were treated on conservative principles, and all recovered.
4 „ by primary amputation at the shoulder-joint, and two of these died.
13 „ by primary amputation of the arm, and two died.
4 „ by secondary amputation, and all recovered.

Thirty-one of the whole number recovered, and 4 died, or 11·4 per cent.

One of the fatal cases in which amputation at the shoulder joint was performed died within twenty-four hours, from some internal complication, and the second on the fifteenth day, from the same cause.

One of the fatal cases after primary amputation of the arm took place in a child aged five and a half, who sank on the fourth day, and the second in an adult, who died from pyæmia in the third week.

On the whole, the result of these cases must be regarded as satisfactory, 89 per cent. recovering. Two cases evidently died from internal complication, one child from the severity of the injury, and one from pyæmia.

Analysis of the 57 *cases of Compound Fracture of the bones of the Forearm.*

27 were treated on conservative principles, and all recovered.
22 „ by primary amputation of forearm; 2 died, or 9 per cent.
5 „ by secondary amputation { 4 of forearm; 1 died. / 1 of arm; 1 died.
3 died from internal complications.

One of the patients dying after primary amputation sank with delirium; a malformed brain and evidence of old arachnitis were discovered after death.

In the second, pyæmia was the cause of death on the twenty-fifth day.

The secondary amputation of the forearm was fatal from exhaustion, the operation having been performed on account of gangrene of the extremity.

The case of secondary amputation of the arm proved fatal from pyæmia coming on five days after the operation: this patient sank four days subsequently.

The favorable termination of these last two classes of cases is borne out by the experience of all surgeons. Such an operation as amputation would of course be only resorted to in the severest examples; and in the more favorable cases a good recovery may, with some confidence, be anticipated.

The majority of the cases of compound fracture of the forearm which are admitted into Guy's Hospital are caused by machinery, and, as a consequence, a complete destruction of the part too frequently exists; this fact explains why so large a proportion of cases are treated by amputation—about 50 per cent., or half of the whole number.

A small per-centage of those only are fatal.

The cases of less severity, which are treated by ordinary measures, are most successful, no fatal instance having been recorded.

The analysis, such as it is, I leave to the notice of the Society; I have not attempted to draw up any general conclusions, as I feel that they would be of little value. I know of no cases in surgery which require to be treated more upon their individual peculiarities than those of compound fracture, and, as a consequence, have not compared the relative success of the cases treated by amputation and those not operated on. I cannot but believe, however, that the members of the Society will find much of interest in the material thus laid before them.

ANALYSIS

OF

FIFTY-TWO CASES OF EPILEPSY

OBSERVED BY THE AUTHOR.

(SECOND SERIES.)

BY

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Received Jan. 23rd—Read Feb. 12th, 1861.

In 1857 the Medical and Chirurgical Society did me the honour to admit into their 'Transactions' an analysis of fifty-two cases of epilepsy which had been recorded by myself. I now again submit a similar analysis of a portion of the cases that have since been under my care, and I prefer taking the same number as on the former occasion, as it may be more convenient for comparison. The results yielded by the total number of the two series taken together may serve to rectify the inaccuracies which the smaller number of one series alone might appear to involve. I may premise that I still hold epilepsy to present sufficiently characteristic features to justify our classing all cases of genuine epilepsy together, and treating them as dependent upon a depraved state of the nervous system common to all. As in the first series, I shall at present only dwell upon those points with reference to which satisfactory evidence could be obtained, avoiding matters of mere opinion, so as not to add to the theoretical difficulties which already

surround the whole question. I shall also follow the same order of inquiry maintained on a former occasion.

Sex.—Of the fifty-two cases, twenty-three were females, or 44·2 per cent.; twenty-nine were males, or 55·8 per cent. This is very nearly the same proportion as in the first series, where the numbers were twenty-four females to twenty-eight males. If we take the two series together, the ratio of the females to males would be as 45·2 to 54·8, giving that preponderance to the male sex which is commonly supposed by British physicians to prevail.

Age.—The following table exhibits the distribution of the cases throughout the different periods of life, the basis of calculation being, as in the first series, not the age of the patient when under treatment, but the age at which the epileptic paroxysm was first stated to have occurred.

Period of first occurrence of fits.	Number of cases.			Ratio per cent.	
0— 5	7	12	37	71·11	From infancy to the age of 20 years inclusive.
6—10	5				
11—15	13	25			
16—20	12				
21—25	3	7	10	19·23	From 21 to 40 years of age inclusive.
26—30	4				
31—35	1	3			
36—40	2				
41—45	2	2	5	9·61	From 41 to 68 years of age inclusive.
46—50	0				
51—55	0	3			
56—68	3				

Here, again, we find a very close agreement with the results obtained by the former analysis, in which the ratios of the three corresponding divisions were respectively 69·23 per cent., 15·38 per cent., and 15·38 per cent. In the former series there was no case above the age of fifty-five, whereas, in the present, three are included in which epilepsy first made its appearance between fifty-six and sixty-eight years of age.

The confirmation which the former analysis gave to the

views of Tissot and Esquirol, as to the greater proclivity of the male sex to epilepsy during puberty, is not renewed in the present instance. The following table gives the distribution of the cases according to sex, and it will be observed that, whereas there are eleven cases of males during the second decennium of life, there are fourteen females; while in the first series there were twelve males and seven females for the same period.

Period.	Males.		Females.	
	Absolute number.	Per-centage.	Absolute number.	Per-centage.
0—10 years.	8	27·58	4	17·39
11—20 „	11	37·93	14	60·86
21—30 „	5	17·24	2	8·69
31—40 „	3	10·34	—	—
41—50 „	1	3·44	1	4·34
51—68 „	1	3·44	2	8·69

Causes.—An hereditary taint was traced with more or less certainty in fourteen cases, but the evidence in nearly half these cases indicated only a generally debilitating influence; in eight, epilepsy was found to have occurred in some relatives of the patient, but only in two had one of the parents been affected.

The following is a brief summary of the hereditary influences discovered in the fourteen instances:

1. The whole family are subject to nervous affections, hysteria, asthma, &c.
2. The father died apoplectic, the mother was frightened by an epileptic patient while pregnant.
3. The mother was shocked by the suicide of a brother previous to the birth of the child, and suffered much in mind in consequence.
4. One sister has fits, and the parents are first cousins.
5. One sister died in fits as a child.
6. The mother and sister are hysterical and choreic.

7. The mother and grandmother are epileptic.

8. Both parents died phthisical; the brothers and sisters died young.

9. A sister is epileptic.

10. A brother is epileptic.

11. The mother very excitable, and in a state of incipient insanity.

12. The mother and sister are epileptic.

13. Several cousins are subject to epilepsy.

14. The grandfather has had one or two fits late in life.

While an hereditary influence is undeniable, it does not appear, from the conjoint results of the two series, that it is traceable with anything like the same frequency as it is in some other morbid conditions, such as phthisis and gout; it is remarkable that the direct descent from parent to child was only noted in two instances. The difficulty of obtaining a positive clue as to the value of hereditary taint in these cases is much enhanced by the mystery with which all families try to shroud cases of epilepsy occurring in their members. In order to ascertain the real value of this predisposing cause, it would be necessary to be informed of the number of persons who are or have been epileptic, and whose progeny are affected with or are free from epilepsy. Although I have such cases in my note-books, they have only been obtained incidentally, and offer no indication as to the general ratio.

The exciting causes to which the fits were attributed by the patients, or which were ascertained by examination to have induced them, were elicited as follows:

Uterine derangement, 9 cases; venereal excesses, 6 cases; fright, 4 cases; over-work, 4 cases; anxiety and dyspepsia, each 3 cases; dentition, 2 cases; scarlet-fever poison was accused, though doubtfully, twice; while meningitis, anæmia, blood-poison, and the development of puberty, were each made responsible in one case respectively. This list includes 37 cases; two more may be added in which the hereditary influence was supposed to be sufficiently strong to account for

the seizures; this leaves thirteen in which no special predisposing or exerting cause was stated or traced.

Premonitory Symptoms.—The approach of the paroxysm was cognisable to the patient by certain symptoms, either perceptible to himself only, or visible also to those about him in twenty-one cases, or 40 per cent. In the former series, above one half, or 52 per cent., exhibited premonitory symptoms. In the cases under consideration they were as follows:

1. Pain in one or both temples. 2. Great fear. 3. Flushing for several hours before the attack, the latter being immediately preceded by a smacking of lips. 4. Fear. 5. A sudden numbness of the head. 6. A peculiar sensation about the heart for five or six hours before. 7. Cross and peevish for a day before the fits. 8. Formerly a sense of dulness before the attacks. 9. Drowsiness and general langour. 10. Lassitude and biliary derangement. 11. A sense of terror, with formication in the right hand, and passing upwards. 12. Sleeplessness and anxiety. 13. Some consciousness of approach of fit. 14. Spasm of left arm and leg. 15. Creeping sensation from the tips of the fingers to the face, with spasms of the muscles of the parts through which the sensation passes. 16. A sensation mounting up the left arm to the head. 17. An indescribable idea. 18. Vertigo and flashes. 19. Turgidity of the face for two days before the attack. 20. A horrible sensation. 21. A feeling of something closing the patient in, at times.

In regard to diagnosis, the presence or absence of a premonition offers no special indication; but it does as to treatment, and it is therefore an important feature. It enables us to ward off an attack, and also allows the patient to place himself in a position where he may escape injury during the seizure. Where the aura commences in an extremity, the fit may generally be prevented by suddenly constricting the limb above the point from which the sensation starts; or if it is a sensation affecting the viscera, the application of cold to the surface, or the administration of some internal remedy, frequently suffices to prevent the impending attack.

Headache.—Headache is associated with epilepsy, either as a sequela of the attacks, as an habitual symptom, or as a precursor and a sequela. It was met with altogether in twenty-three out of the fifty-two cases, or in the ratio of 44·2 per cent.; which is considerably less than in the former series, where the frequency of headache was 63·4 per cent.

The headache was constant or frequent in nine cases, or 17·3 per cent.

It occurred after the fits only in twelve cases, or 23 per cent.

It occurred only immediately before and after the fits in three cases, or 5·7 per cent.

It is manifest that the importance of this symptom must vary much, not only according to its severity, but more particularly according to the time at which it occurs. When affecting the patient habitually or frequently, it deserves much more serious attention as an indication of intracranial mischief, than when it appears only as a result of the vascular derangement induced by the fit itself. The bearing which it will have in influencing the treatment must vary accordingly.

Biting the tongue.—In the present series, twenty-eight patients were found to have bitten their tongue more or less frequently in the paroxysms, or 53·8 per cent. This is a larger proportion than in the former series, in which the ratio was 32·7. It is to be noted that in three of the cases this symptom was only observed in one fit, whereas in all the others it occurred frequently. The views of Schrôder von der Kolt regarding the limitation of the irritant in its action upon certain portions of the medulla oblongata, according to the presence or absence of the symptom in question, receive a general confirmation from my experience; at the same time, the fact of the tongue being bitten once, in cases in which this symptom does not otherwise accompany the fits, shows that the irritant cause may, at different times, involve different parts of the base of the brain.

Thinking that possibly the cases in which the tongue was *not* bitten might prevail among the female sex, and hence

raise a suspicion of the hysterical element predominating, I analysed the cases with reference to this particular point; but the reverse of my anticipations resulted; for of the twenty-four cases in which there was no record of the tongue having been bitten, sixteen were males and eight females; and whereas only one of the former left any doubt on the point, there were three among the latter in which the details of the cases being somewhat scanty, it is possible that the symptom was accidentally not adverted to.

Urine.—I have continued to examine the urine of epileptic patients, but have failed to detect any uniform derangement. Sugar I have never found, nor has there been in any of my cases either a constant or a frequent excess of phosphates or a diminution of urea; these being the features upon which previous observers have dwelt. So far from the urine being characterised by a frequent diminution of urea, I have in several cases met with a high specific gravity, ranging about 1030, in which there was a considerable excess of urea. In the present there was no case of albuminuria, excepting perhaps one instance in which a small quantity of albumen appeared to be present for a brief period. An excess of phosphates was seen twice. Oxalates were found in one or two cases, and a large deposit of lithates was also met with in a small number of cases; but although the treatment was varied according to these symptoms, none of them appeared with the frequency or uniformity which some writers would lead us to expect.

Among the symptoms referable to the abdominal organs, constipation and flatulency were certainly the most frequent, and seemed to depend upon that atonic habit which prevailed in most of my cases. The derangement of the chylopoietic viscera in some was so prominent, as almost to justify the view entertained by certain writers, that the sympathetic is the part of the nervous system most at fault in epilepsy; it was, however, on close examination always manifestly a concurrent effect of the fundamental lesion, rather than a fundamental lesion itself.

Treatment.—Under this head, I would reiterate the con-

viction expressed in my former paper, that, however sceptical we may be in reference to permanent cures of epilepsy, we have just grounds for believing in the real efficacy of properly selected treatment in alleviating the disease, and often of indefinitely postponing the seizures. Perseverance and patience are demanded alike of the patient and the physician; but, above all things, it is necessary that the latter should have the full moral support of the patient and the patient's friends. The aid of the patient's friends is particularly a *sine quâ non* in the treatment of children and adolescents.

Many of the patients whose cases have been analysed in the present series have been seen in consultation, and have not therefore been continuously under my own observation; hence I am enabled to give a positive statement of the results attained in only a part. I have reason to believe, after a considerable lapse of time, that eight were cured; decidedly benefited, fifteen; while the remainder were partly uninfluenced by treatment, or did not continue a sufficient period under observation to justify any statement as to the result. I find that sixteen of the cases were seen only once or twice, which must be borne in mind in estimating the effect of treatment.

As I have neither discovered nor believe in the existence of a specific for epilepsy, and as I do not profess any method of procedure not already employed by physicians, I refrain from going into detail in this paper as to treatment. I adhere to my formerly expressed view as to the necessity of an eclectic treatment, selected according to the features of each individual case. In epilepsy, specialism is to be particularly avoided, and I hold that the physician who enjoys the best general knowledge of his profession will also be best qualified to deal with this particular affection.

ON

PULSATING BRONCHOCELE.

BY

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COMMUNICATED BY

SIR B. C. BRODIE, BART.

Received Jan. 1st.—Read Feb. 26th, 1861.

A GENTLEMAN, in October, 1858, consulted me on account of two pulsating tumours, one on each side of the trachea, attended by so much purring sound, as well as vibration communicated to the touch, that the disease at first sight was like double carotid aneurism, for which, indeed, it had been taken. On careful examination, both lobes of the thyroid gland proved to be enlarged, with violent pulsation of both carotids and dilatation and pulsation of the thyroid arteries, which arterial pulsation was communicated to the enlarged lobes. The patient attributed these enlargements to the pressure round his neck of tight shirt-collars. He had grown so thin in an illness in the spring that his shirt-collars were taken in, but in the autumn he grew stouter, and felt considerable inconvenience from their tightness. He took a severe cold, and both these enlargements he became aware of about three weeks before I saw him. He had been under my care in April, owing to great general debility, rheumatic pains, an overloaded and torpid colon, following over-fatigue in hunting, to which he had not been of late years accustomed. This state was attended with an habitually quick pulse, and much irritable over-action of the heart. He was of a nervous temperament, with light hair,

thin skin, and delicate organization, and about forty-five years of age. What was especially striking and new in his appearance now was that unusual prominence in the eye-balls which is often seen in anæmic young women with enlarged thyroid glands, and this symptom was confirmatory of the diagnosis. His heart and vascular system generally were still in a highly excitable state. His pulse (habitually quick) quickened up to 120, with flushing of the face and corresponding increased impulse of the heart, whilst he was under examination. There was much muscular weakness. Dressing in the morning exhausted him. He could not walk without fatigue, and could only ride slowly. I advised him to take much bodily rest on the sofa, to breakfast in bed, to take very little walking and slow riding exercise, with nutritious food and quinine, and to have a liniment, composed of one drachm of tincture of iodine and two ounces of soft soap, gently rubbed in every night, or as often as he could bear it without irritating unpleasantly his very sensitive and thin skin. This plan suited him, and in February, when I again measured his neck, the left lobe had considerably diminished, so that the neck was half an inch less in circumference. But still the pulsation continued, and as aneurism had been mentioned, and his family were anxious, I recommended him to consult Sir Benjamin Brodie, to decide the point. Sir Benjamin Brodie most carefully examined him, and the following is a copy of his letter to me:

"Savile Row; February 17th, 1859.

"My dear Sir,—After a very careful examination of Mr. —'s neck, I cannot make out that there is any actual dilatation of the carotid arteries themselves. I find an enlargement of both lobes of the thyroid gland, but more of the left than of the right lobe. A part of that enlargement, especially at the lower part, being evidently of solid substance, and the remainder consisting, apparently, of a dilatation of the numerous ramifications of the thyroideal arteries. I have observed the same purring sound to exist

in some of those cases of pulsating medullary tumours which are sometimes to be met with. Many years ago I saw a young man with the thyroid gland, if my recollection be accurate, increased to a much larger size; there being the same thrill and pulsation through the whole mass. I prescribed for him the old remedy of burned sponge (which, by the way, I have often known to do a great deal of good after the iodine had failed). I am not certain whether I ever saw the patient afterwards, as he lived at a distance from London, but the impression on my mind is that I either saw him or heard of him afterwards as being very much better. I enclose the formula which I have generally employed in using the burned sponge, observing that care is required that it be real *burned* sponge, well prepared, and without adulteration. I do not recollect that I have ever seen another case of pulsating bronchocele, but I believe that when I inquired about it formerly I found that it had been described by some writers.

"I am, dear sir, yours truly,

"B. C. BRODIE.

"℞ Spongiæ ustæ,
Conf. Rosæ Caninæ, ana ℥j;
Syr. Aurantii, q. s., ut ft. electuarium.
Cujus sumat cochleare j minimum ter quotidie.
"Februarii 17, 1859. "B. C. BRODIE."

Whilst in London this gentleman saw Dr. Watson, who was much interested in his case, and who prescribed iron, which he took for some time with advantage. Owing to the bulk of the burned sponge, the patient did not persevere with it, but small doses of hydriodate of potash were substituted, and a liniment of hydriodate of potash and ammonia, instead of the iodine-and-soap liniment, which irritated his skin, were prescribed by his former medical attendant. By these remedies, and a strict attention to his general health as his strength improved, the pulsation gradually diminished simultaneously with the decrease of the enlarged lobes of the thyroid gland. When last I examined him there was a

small, hard enlargement of the right lobe remaining, but no pulsation. His general health was good, but there was still undue prominence of the eyeballs.

In October, 1858, shortly after meeting with this case, a second presented itself, in which both lobes of the thyroid gland were much more enlarged, and the increased pulsation of both carotids and of the dilated thyroid arteries communicated their motion to the gland; but from the large size of the bronchocele, there was no such difficulty in the diagnosis. The patient was a woman, with light hair and eyes and a fair skin, and with the same prominence of the eyeballs. She was fifty-two years of age, and the bronchocele had existed two years, beginning soon after she ceased to menstruate. She observed the pulsation three months after the commencement of the enlargement of the gland. She was now confined to her bed with ascites and anasarca of both legs, and she did not expect to recover. There was evidence of disease of the mitral valve, with dilatation and hypertrophy of the left ventricle. She passed very little urine; the whites of the eyes were yellow; no sleep; dyspnœa, and inability to lie flat. The jugular and superficial veins of the neck were very large and distended with blood, the latter forming a network over the front of the neck; the pulsation of the carotid arteries and of the dilated thyroid arteries was violent, with purring sound and thrill to the touch, and this pulsation was communicated to all parts of the enlarged lobes of the thyroid gland. The appearance was most formidable, and increased by the projecting eyeballs. The case seemed a very hopeless one, from the dropsical symptoms and impaired heart, but it proved to be one of those in which diuretics fully answered their purpose, and with the removal of the effusion there was a general improvement of the health. As there were scars and stains on the legs, as if from old secondary sores, an alterative mercurial and iodide of potassium were combined with the diuretics. A fortnight afterwards, when next I saw her, the copious diuresis had

removed the ascites and anasarca, the distension of the veins of the neck was gone, and the arterial pulsation diminished. She slept better, and was in all respects improved. The ammonio-citrate of iron was added to the diuretic mixture, and a liniment of iodine and soft soap was rubbed into the neck daily. She continued perseveringly with the diuretic and mercurial and liniment for four or five months, diminishing gradually the number of doses, and she steadily improved until all pulsation in the bronchocele had ceased and the gland had considerably diminished in size. The eyeballs remained prominent, but less so.

As Sir Benjamin Brodie, in his vast experience, has only seen one case of pulsatory bronchocele besides one of these, it seems to be worth putting these two on record.

Both were benefited by iodide of potassium internally and iodine externally, and by iron; but in both cases the chief point in removing the pulsation was by improving the general health, in one case by relieving great general debility by tonics, fresh air, nutritious food given frequently, and much bodily rest, and in the other by diuretics removing a dropsical condition and venous plethora. The most important lesson taught by them is in their prognosis. The appearance in both was formidable, and might easily excuse the suspicion of aneurism or malignant disease, but in both the pulsation proved to be a harmless and remediable complication. In both the undue prominence of the eyeballs was well marked and a useful diagnostic symptom.

REMARKS ON THE CAUSE

OF

CLOSURE OF THE VALVES OF THE HEART.

BY

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In reflecting upon the causes by which the closure of the auriculo-ventricular valves of the heart is effected, it occurred to me that the explanation of the physiological fact generally received was insufficient to account for the whole of the phenomena which attend it. A reference to the opinions held by physiologists respecting the causes of the closure of these valves will, I think, satisfy every one that a complete explanation of the fact has not yet been given.

With regard to the *mode* of closure of the valves in question, physiologists, are, I believe, at the present moment generally agreed. The received opinion is this—the closure is effected at two different periods of the heart's action, and may therefore be divided into two stages. During the *first stage* (which corresponds to the period of the ventricular diastole and the passage, of course, of the blood from the auricle into the ventricle) the valves are gradually raised upwards towards the auriculo-ventricular orifices, *pari passu* with the distension of the ventricles, so that their free borders are made to approach each other. The *second stage* of the closure of the valves corresponds, in time, with, and is effected by, the ventricular systole; the loose borders of the

valves, already raised upwards towards each other, are suddenly and forcibly brought together by the pressure of the blood upon their ventricular surfaces. In this way, and by the simultaneous contraction of the papillary muscles, the complete closure of the opening is perfected and maintained during the time of the ventricular systole.

Now, as far as I have been able to learn, the cause which is effective in raising the valves upwards towards each other during the *first stage* of the closure above referred to has not been correctly explained. A little consideration, indeed, will, I think, satisfy every one that the explanation usually given of the fact cannot be correct. The matter is disposed of as follows in Todd and Bowman's 'Physiology:'—"When the blood accumulates in the ventricles it pushes up the auriculo-ventricular valves towards the auricle, until their several portions come in contact with each other and close the orifice." The latest writer on the heart's actions, Dr. Halford, writes as follows on this head:—"The auricles contracting on the blood, the force of their contraction is transmitted by the blood in all directions, separating the flaps of the valves, distending the ventricles, and (the semilunar valves being shut down) pressing as much upwards and backwards, as downwards and onwards. The force, not being sufficient to raise the semilunar valves, is expended in distending the ventricles *and raising and closing the auriculo-ventricular valves.*"

The views of these authors are, I believe, the generally accepted explanation of the fact. The flow of blood from the auricle and the force of the auricular contraction, as it is supposed, force the valves upwards and into contact during the diastole of the ventricle.

It is evident, however, that this explanation is incorrect, and that, in fact, the stream of blood flowing from the auricle into the ventricle cannot possibly raise the valves upwards. During life the size of the auriculo-ventricular orifice is, of necessity, exactly adapted to the size of the current of blood which passes through it during the ventricular diastole, and, consequently, the current of blood

passing from the auricle into the ventricle, whatever be the degree of force which drives it along, is in immediate contact with the auricular surface of the valves, and *must* press with as great force upon the upper as it does upon the under surface of the valves. Such a force could not, therefore, effect the elevation of the valves towards each other, *i. e.* their closure, during the ventricular diastole. The truth is that the pressure of the current of blood is greater upon the upper than upon the lower surface of the valves, and would therefore rather tend to depress than raise the valves. And there is another objection to the usually received explanation. At the conclusion of the ventricular systole the valves, we must suppose, are brought into close contact with the inner walls of the ventricle; consequently, the current of blood flowing into the ventricle during its diastole would rather tend, than otherwise, to keep them closely applied against the ventricular walls.

Such considerations satisfied me that the valves must be raised up towards each other during the ventricular diastole by some other agency, and on investigation of the subject I ascertained what I have no doubt is the true explanation of the phenomenon.

The valves are raised from the walls of the ventricles towards each other during the ventricular diastole by the agency of elastic tissue, which is so disposed within them as to render the action at once simple and effective. The auriculo-ventricular and the semilunar valves of the heart have all, essentially, the same structure. They are formed of two distinct parts—an elastic membrane, and a number of inelastic, white, fibrinous cords, united together by elastic membrane. In the case of the auriculo-ventricular valves (and I am speaking of the structure as observed in a bullock's heart) a thickish layer of elastic membrane may be readily dissected off from the auricular surface of the valves; this layer moves freely on the lower layer of the valve, except at the free border of the valves, where it becomes intimately connected with the lower layer of the valves. This elastic layer is retractile in all directions, but its fibres appear to

run chiefly in a direction from the attached towards the free borders of the valves. The lower or ventricular layer of the auriculo-ventricular valves consists of strong cords of white, fibrous tissue—the continuation of the chordæ tendineæ into them—subdividing and diminishing in size as they branch out in the valves. These branching white, fibrous cords are united together by elastic tissue, but chiefly by their upper auricular borders only, the lower border of the cords projecting from the under surface, and giving it a rough, furrowed appearance. (Dr. Broadbent, the Curator of St. Mary's Hospital Medical School, has, at my request, made a series of dissections of the valves of bullocks' hearts, and I subjoin his detailed description of their structure.)

From this disposition of the elastic tissue we may fairly conclude—that when its elasticity is called into play, it must tend to draw the free borders of the valves towards their attached borders; and that, inasmuch as the elastic fibres are chiefly placed in the upper layer of the valves, they must necessarily tend to approximate the two borders of the valves in the direction of their auricular surface. This is, in fact, what happens. When the ventricles are emptied, *i. e.* at the end of ventricular systole, the valves are brought down and pressed against the internal walls of the ventricles, and, as we must conclude, the elastic tissue put on the stretch. But during ventricular diastole, as the blood flows into the ventricles, the weight (the specific gravity) of the valves is diminished by the fluid, so that the elastic fibres have power enough to draw the valves upwards towards each other and to close partially the auriculo-ventricular orifice, the valves rising up in the ventricle *pari passu* with its dilatation. I may add that the elasticity of the endocardial membrane surrounding the auriculo-ventricular valves also assists in the elevation of the valves.

Such is what may be called a theoretical description of the mode of action of the valves, deduced from their anatomical structure. But the simplest experiments will satisfy any observer *that no other explanation of the fact is*

possible. When the auricle is removed from its ventricle, and water poured into the ventricle, it will be found that the valves not only gradually rise upwards towards the auriculo-ventricular orifice whilst the water is flowing into the ventricle, but that they remain in an upraised position when the stream is arrested, and that they will, if depressed, again arise towards each other when the pressure is removed. Now, as their specific gravity is considerably greater than that of water or of blood, it is manifest that they would neither rise up towards each other in the water nor maintain that elevated position unless some force overcame their gravity; and it is equally evident that no other force than that of elastic tissue could, from the nature of the case, be in operation. Again, when the free borders of the valves are separated from their attachments to the chordæ tendineæ, the valves will be found to have a natural tendency to curl over in the direction of their auricular surface. In the case of a dog I have thus seen the anterior mitral valve actually curl up into the auricle like a scroll of paper.

As corroborative of this view of the cause of closure of the auriculo-ventricular valves, I may add that we find an exactly similar anatomical disposition of parts in the semilunar valves, but with this necessary difference, that in their case the elastic fibres are spread over the ventricular surface of the valves. The purpose of this elastic tissue is manifestly the same here as in the former case, viz., to assist in drawing the valves away from the arterial walls (against which they must be closely pressed during ventricular systole), and thus in bringing them together, or, rather, of putting them into a position of being readily brought together, when the ventricular systole ceases.

I will, in conclusion, suggest that this view of the mode of closure of the valves may explain some facts in diagnosis which have hitherto puzzled the physician, as, for instance, the existence of a cardiac murmur heard during life in cases in which the valves have been found after death, to all appearance, competent. In such a case I would suggest that the elastic element of the valves has undergone some

pathological change, whereby its elasticity has been impaired or destroyed, and, therefore, that the valves were no longer able to rise up freely towards each other during ventricular diastole. In consequence of such imperfect action a certain amount of regurgitation must necessarily occur at the commencement of the ventricular systole, and, consequently, a murmur be excited. The fact also shows that, to prove the capacity of the auriculo-ventricular valves for effective closure during life, we must ascertain the condition of their elastic powers after death, in the manner above described, viz., by removing the auricles of the heart and filling the ventricles with fluid. The greater or less degree of readiness with which these valves rise in the fluid will indicate the condition of their elastic tissue.

Appendix.

Since the above paper was read to the Society I have satisfied myself that there is one other element of force which either does, or may, play a part (at a given moment) in the closure of the auriculo-ventricular valves. This *force* is the elasticity of the distended ventricle itself, called into action by the distending force of the auricular systole; and the given *moment* is that instantaneous period of time which intervenes between the conclusion of auricular systole and the commencement of ventricular systole. The force of the auricular contraction (which, as we have seen, comes into play during the second period of the ventricular diastole) drives forward the blood, and not only dilates, but also forcibly stretches, the ventricles. Consequently, when this distending force (the auricular contraction) ceases, the elasticity of the distended ventricles comes into play, reacts on their contents, and therefore necessarily presses the blood against the ventricular surface of the auriculo-ventricular valves. By this pressure these valves are brought into perfect contact, and the closure of the auriculo-ventricular orifice completely effected. This is what we

must, theoretically, admit to take place *during that minute interval of time which occurs between the cessation of auricular and the commencement of ventricular systole.*

Dr. Broadbent's Account of the Structure of the Valves of the Heart.

The auriculo-ventricular and arterial valves of the heart are essentially similar in structure, and are made up of two distinct layers, slightly moveable one on the other, except near the margin where they coalesce to form the thin membranous edge; of these layers, one is elastic and smooth, the other comparatively inelastic, and presenting fibrous, trabeculæ running in various directions.

When one of the flaps of the mitral or tricuspid valve is examined, its superior or auricular surface will be seen to be perfectly smooth and continuous with the endocardial lining of the auricle, without any other line of demarcation than the difference in colour between the subjacent muscular fibres of the auricle and the fibrous tissue of the valve. The ventricular surface, on the contrary, is marked by numerous fibrous trabeculæ, which radiate in various directions from the chordæ tendineæ. The large cords implanted into the body of the valve spread out on its under surface into many strong bands, which pass chiefly towards the attached border, and are firmly fixed in the fibrous ring which surrounds the auriculo-ventricular opening; some, however, go towards the free margin, and seem to receive the fine ramifications of the delicate chordæ tendineæ inserted into, and near, the extreme edge of the valve. On this aspect the line of origin of the valve is marked by a distinct groove, and its fibrous trabeculæ are perpendicular to the muscular pillars of the ventricle.

If incisions be made through the endocardium of the auricle, and carried down upon the valve, a thin, transparent

membrane is readily raised from the muscular substance of the auricle, and from the superior surface of the valve to near its margin. This is extremely elastic, and, on microscopic examination, is found to consist chiefly of a network of very fine, elastic fibres, having a general direction from the attached to the free border of the valve. A second membrane may readily be separated almost equally elastic, and containing much elastic tissue, with a similar arrangement; this is not continuous over the muscular fibres of the auricle, but seems to terminate in them; and in a bullock's heart delicate slips of muscle are continued for a distance of one fourth or three eighths of an inch into it.

There is now left the layer formed by the radiating divisions of the chordæ tendineæ, united to the preceding membrane by connective tissue, containing many elastic fibres; the fibrous bands themselves also being connected together by similar material. These bands are made up almost entirely of white, fibrous tissue, they are absolutely inelastic, and render the layer of the valve into the composition of which they enter comparatively so. The endocardium of the ventricle extends as a very delicate membrane over the under surface of the valves. The semilunar valves are smooth on their ventricular or convex surface, the endocardium here also passing continuously over this aspect of the valve, and constituting a strong, elastic membrane, in which the fibres have a general direction from the attached to the free border of the valve. There is a second layer containing much elastic tissue, and when this is removed there remains, at the concave aspect of the valve, a membrane presenting an arrangement of strong, fibrous bands stretching transversely across from one angle to the other, and forming at the centre of the valve an imperfect raphé. These bands are inelastic, but are connected with each other by tissues containing a considerable proportion of the elastic element.

PATHOLOGICAL RESEARCHES

INTO THE

DISEASES OF THE EAR.

(SEVENTH SERIES.)

SEBACEOUS TUMOURS IN THE EXTERNAL AUDITORY MEATUS;

THEIR EFFECTS UPON THE ORGAN OF HEARING, THE PETROUS BONE AND THE BRAIN, WITH SUGGESTIONS AS TO THEIR TREATMENT.

BY

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In a tabular statement of the morbid appearances found on the dissection of 1013 diseased ears, published in the thirty-eighth volume of the 'Medico-Chirurgical Transactions,' I reported ten instances in which a sebaceous tumour was developed in the external auditory meatus.

Since the publication of the paper containing that statement, I have made several additional dissections in which sebaceous tumours were contained in the auditory meatus, and I have also had the opportunity of studying the disease in cases which have fallen under my observation in hospital, and in private practice.

Inasmuch as sebaceous tumours generally produce deafness, and almost invariably cause disease of the petrous bone (disorganization or abscess of the brain being a result in some cases), as their presence in the meatus is far from being infrequent, and as they do not appear to have been

recognised by the medical profession, I am induced to lay before this Society the results of my observations upon them.

Sebaceous tumours are described by writers on the subject of skin diseases as occurring in different parts of the body,[1] but I am not aware that their presence in the external auditory meatus had been even alluded to previously to the publication of my dissections.

Nevertheless there can be but little doubt that cases of this disease occurring in the ear, and producing very singular results, must be constantly presenting themselves to the notice of members of the medical profession; it is not improbable that they are included under the category of cases of otorrhœa, and when the petrous bone and the brain become diseased they are probably looked upon as cases of caries resulting from otorrhœa.

The results of my observations upon the *structure* of these sebaceous tumours tend to show that they are almost wholly composed of flattened cells of a large size, and very similar to those constituting the epidermis. These cells are arranged in layers; they are enclosed in a distinct membranous envelope, formed of areolar tissue. When developed in the ear, these tumours do not appear to result from a morbid change of the hair-bulb or its follicle; indeed, they frequently occur in the innermost part of the meatus, close to the membrana tympani, where no hairs are to be found. Their shape is usually spherical, and they are met with in every part of the external meatus. They possess the singular property of increasing towards their attached surface equally with that towards the cavity of the meatus, and the result is absorption of the petrous bone. I am not aware that I have dissected a single sebaceous tumour in the external meatus, however small, that had not caused some absorption of the osseous wall. These tumours vary in size from a millet-seed to a large hazel-nut. When of the latter size, they cause an enormous dilatation of the meatus, so

[1] Mr. Erasmus Wilson has also given them the name of *sebiparous* tumours.

that not unfrequently a finger may be passed inwards as far as the membrana tympani. They also produce absorption of the bone to so great an extent that a communication is found with the mastoid cells, tympanum, cerebral or cerebellar cavities. Their progress would seem to be more impeded by the presence of a membrane than by bone, as the membrana tympani frequently remains entire when the surrounding bone has been absorbed. In one case, which will be cited, the tumour went through the external and then the internal osseous walls of the mastoid cells, and came into contact with the dura mater; instead of penetrating it, the tumour passed upwards, causing absorption of the posterior, and then the upper, wall of the petrous bone, and eventually entered the tympanic cavity, without producing any perforation in the dura mater. It is a remarkable feature of this disease that the tumour may pass through the substance of the petrous bone, causing a large aperture in it, without producing any visible effect upon the surrounding osseous tissue, the margins of the aperture being often as sharp and well defined as if made by a chisel.

Sebaceous tumours grow in the external meatus, and even reach to a considerable size, causing absorption of the bone, without the occurrence of pain; indeed, as a rule, the attention of the surgeon is called to them either on account of the deafness which follows the occlusion of the meatus, from the presence of a fetid discharge, or from symptoms of irritation of the brain, which too often terminate in death.

The circumstance that the presence of a sebaceous tumour in the ear seems capable, by the irritation it causes, of producing an abscess in the brain, may be adduced as additional evidence (if further evidence be required) in favour of the opinion that, when abscess in the brain coexists with disease of the petrous bone, the abscess is caused by the affection of the ear, and the disease of the petrous bone is not caused by the abscess in the brain.

The effect of sebaceous tumours upon the membrana tympani and the contents of the tympanum is worthy of observation, the result being, not uncommonly, very serious deafness.

In some instances the tumour presses upon the exterior of the membrana tympani, gradually forcing it inwards until its inner surface is in contact with the outer surface of the promontory; in other cases the tumour passes through the membrana tympani, producing an orifice with defined margins.

The only disease for which sebaceous tumours are likely to be mistaken is the presence of one or more osseous growths in the meatus, covered by the dermis; gentle pressure with the rounded extremity of a probe is, however, sufficient at once to discriminate between the two kinds of growth.

Treatment.—Considering how strong a tendency sebaceous tumours have to advance inwards, and thus to injure the membrana tympani and the bone, the effort of the surgeon should be to extirpate them as completely as is practicable. A simple incision into the substance of the tumour, and the evacuation of its laminated contents, is productive of no permanent benefit, the layers of epidermoid cells being rapidly reproduced. The desired object is the removal of the firm capsule of the tumour, which appears to be the parent of the cells. This can be effected by making a crucial incision into the tumour, and after squeezing out the laminæ, the firm wall may be seized by a pair of forceps and the whole of it withdrawn. In the later stages of the disease, when ulceration has taken place in the free surface of the tumour, producing discharge of a highly fetid odour, much care is required in the removal of the laminated contents of the tumour, and more especially of the wall, the attached surface of which may be in contact with the dura mater. In the first place, the ear should be frequently syringed with warm water, the stream being directed against the contents of the tumour. The flakes that remain after this operation has ceased to bring away any further secretion may be carefully seized and withdrawn by the lever-ring forceps, with which instrument the outer wall of the tumour may also be extracted. In cases where, from the remote position of the tumour, it is found impossible to extract the

wall, it is of importance that the case be carefully watched, and the laminæ removed as fast as they are secreted. It might appear unnecessary to remove the contents of the tumour so completely when a large opening exists towards the cavity of the meatus, but from the observation of cases it is highly probable that being open towards the cavity of the meatus, and even freely discharging, does not prevent a sebaceous tumour advancing towards the brain.

I will now proceed to give the particulars of six cases of sebaceous tumour in the external meatus, accompanied by an account of appearances found upon dissection. I will then present in a tabular view the leading features of all the instances which have fallen under my observation, and in which I have been able to conduct dissections; I will, lastly, cite one or two of the cases I have treated successfully.

(A) *Cases with Dissections.*

CASE 1.—*A sebaceous tumour developed in the posterior and outer part of the external meatus, causing extensive absorption of the petrous bone, and accompanied by an abscess in the cerebellum.*—M. W—, æt. 24, was admitted under my care as an in-patient of St. Mary's Hospital on the 6th of July, 1860. Of a delicate constitution, she had always resided with her parents, attending to minor household duties and teaching in a Sunday school. Since a child she is stated to have been subject to sick headaches. Four or five years ago she began to have a discharge from the right ear, and seven weeks since, this ear was attacked by violent pain, which was followed by a sudden increase in the quantity of the discharge. Accompanying the pain in the ear there has been a very severe pain in the head, which has wholly incapacitated her from following any kind of occupation. When seen on the 7th of July she suffered from constant pain at the back of the head and neck, accompanied by giddiness; at times the pain extended to the forehead, and she became delirious. She had double vision, but she saw distinctly

with either eye when used singly. Pulse 80, and weak. The meatus was full of thick, flaky discharge, of a very fetid character. Leeches were applied behind each ear, and a blister to the nape of the neck. On the following day there was intense pain in the head, both in the frontal and occipital regions. The patient lay on her back, moaning constantly and sighing deeply. Pupils equal, and perhaps slightly dilated; they were perfectly sensitive to light. Pulse very slow, varying from 20 to 16 per minute. The patient died suddenly at 2·30 a.m. on the 10th, immediately after taking a cup of tea for which she had asked.

Autopsy.—On removing the brain, no abnormal change was observed until the tentorium on the right side was punctured, when two or three drachms of serous fluid escaped, the quantity escaping last being turbid. The cerebellum on the right side was found to be adherent to the corresponding petrous bone for a space of about one third of an inch in diameter; at this part, as well as at the superior surface of the bone, the dura mater was discoloured. On examining the cerebellum, an abscess, of the size of a large walnut, was observed at the anterior and superior part of its right hemisphere; it was quite superficial, and its walls were thin. The meatus externus was full of discharge, principally composed of flakes, looking like masses of epidermoid scales. On the removal of this discharge an aperture was observed in the outer part of the osseous meatus at its posterior surface. This aperture, the margins of which were sharp and well defined, measured about three quarters of an inch long and half an inch broad. It was surrounded by perfectly healthy bone and communicated with a cavity which was full of laminæ, having the appearance of epidermis arranged concentrically, and bearing an exact resemblance to the tumours I had frequently examined, to which the name molluscous or sebaceous had been applied. This sebaceous matter extended backwards through an aperture in the posterior part of the petrous bone as large as that in the meatus, and was in contact with the dura mater, which separated the walls of the abscess from the tumour. The

laminated, sebaceous matter also extended upwards at the posterior part of the petrous bone, having completely destroyed the superficial layer of bone, and then passed horizontally outwards, beneath the bone forming the upper part of the petrous bone, until it reached the tympanic cavity, which it entered and wholly filled, pressing upon the inner surface of the membrana tympani, and causing an orifice in it.

CASE 2.—*Sebaceous tumour in the right meatus externus, extending upwards towards the cerebrum, and attended by an abscess in its substance.*—S. A—, æt. 72, was first seen by his medical attendant on the 20th of September, 1859. For some days previously he had displayed symptoms of considerable excitability, and on the day when medical advice was requested he at times had symptoms of partial unconsciousness, and he passed his fæces involuntarily. When seen, his tongue was foul and his pulse very weak.

He was ordered a blister to the nape of the neck, and five grains of blue pill, in conjunction with two thirds of a grain of opium, were administered at night.

21st.—He appeared greatly exhausted, and picked the bedclothes; tongue very foul, bowels not moved. Two ounces of port wine were administered.

22d.—Was more sensible; he still picked the bedclothes, though to a less extent than on the previous day. Bowels not moved. The wine to be repeated, and a cathartic enema to be administered.

23d.—In the same state; the wine to be continued.

24th.—Is extremely low, and wanders in his mind very much. He remained in this state till the 30th of September, when a discharge was observed to take place from the right ear. His daughter, upon being questioned, then stated that her father had suffered from an occasional shooting pain in the right ear, which extended upwards to the side of the head, during the whole of the previous winter, and that about ten weeks since the discharge had, for the first time, issued from the right ear. No history could be obtained of any disease

of the ear during the early periods of life, nor, until the period when medical relief was sought, had he evinced any symptoms of mental derangement. No relief to the head symptoms followed the appearance of the discharge, which became abundant and very fetid, and he died on the 22d of October.

Autopsy, twenty-four hours after death.—The body was much emaciated. Upon the removal of the calvaria no appearance of disease was manifested, but on lifting up the cerebrum for the purpose of removing it a large quantity of purulent matter gushed from the under surface of the right middle cerebral lobe, where it overlay the petrous bone. On examination of the brain it was found that an abscess, of the size of a pigeon's egg, was situated in the most dependent part of the middle cerebral lobe; it presented a considerable aperture, through which the pus had escaped. Upon making a section of the brain, numerous red spots were visible in the white substance surrounding the abscess, and purulent matter was also found over the surface of the pons varolii and medulla oblongata. The lateral ventricles were also full of pus. The dura mater covering the petrous bone was not diseased, but it adhered to the bone more firmly than natural.

Dissection of the ear.—A sebaceous tumour as large as a hazel nut filled the meatus externus, which was dilated to between twice and thrice its natural size. The tumour extended upward towards the cavity of the cranium, and downward towards the root of the styloid process. The superior wall of the osseous meatus had, in reality, wholly disappeared, and the cavity in which the tumour was placed was bounded above by a small part of the upper wall of the tympanum and by the dura mater; the latter covered an aperture in the bone a third of an inch broad and three quarters of an inch long, and over the whole of this surface the dura mater was in contact with the upper surface of the tumour. Below, the tumour had so far dilated the osseous meatus that the lower wall of the latter extended half an inch below the membrana tympani, and was hollowed out

of the root of the styloid process. In front, the tumour had so pressed upon the layer of bone separating the meatus from the temporo-maxillary articulation as to reduce it to the thinness of a fine shell, while behind it was separated from the portio dura nerve by an osseous lamina equally thin. Internally, the tumour pressed upon the outer surface of the membrana tympani, which had so far receded inward as to be in contact with the promontory. The portion of the osseous meatus situated immediately above the membrana tympani had been absorbed, so as to expose the bodies of the malleus and incus; these two bones were dislocated the one from the other, and pressed against the upper part of the inner wall of the tympanum. Upon a careful examination of the aperture in the upper wall of the tympanum produced by the tumour, a fine, sharp ridge of bone was observed at its anterior part, as if it had been turned up by the tumour.

Case 3.—*Sebaceous tumour in the meatus externus of each ear; petrous bones diseased; paralysis; death.*—R. W—, æt. 66, died on the 16th of May, 1851. The following scanty notes contain all the information respecting the case which I have been able to collect. About a year previous to his death the patient suffered from pain in the right ear, from which a copious discharge was observed to take place; he at this time complained of deafness, headache, and giddiness. These symptoms somewhat abated, and he ceased to be under medical care till the 7th of May, 1851, when he again applied for relief, having been suddenly seized with vomiting, shivering, and inability to stand. On the following day he became comatose, and on the 10th he was seized with paralysis of the right side of the body. He remained comatose and paralysed until the 16th, when he died.

Dissection.—The brain was not examined. *Right ear—Meatus externus.*—Upon looking into the cavity it was found completely full of a white, lardaceous mass, having a very offensive odour. This mass, on minute inspection, was found to consist of an immense number of laminæ, packed

closely together like the coats of an onion. The laminæ were easily separated from each other, and upon microscopic inspection were found to be composed of large, flat scales. Upon removing the tumour layer by layer it was found to have occupied the cavity of a size to have received an ordinary hazel-nut; the posterior wall of the meatus had been wholly absorbed, and the tumour had extended from the cavity of the meatus to that of the tympanum and mastoid cells, being separated from the two latter cavities by a distinct membranous capsule. The upper part of the tumour had pressed against and caused absorption of the upper wall of the tympanum, so that the tumour at this part was in contact with the outer surface of the dura mater. The margins of the orifice in the upper wall of the tympanum were sharp, well defined, and appeared perfectly healthy: dispersed over the outer surface of the tumour were small, thin particles of bone, having the appearance of fractured portions of the original osseous lamella. The tumour had extended inward so as to destroy the posterior and superior third of the membrana tympani, and it had apparently caused absorption of the whole of the incus and of the crura of the stapes. The malleus remained attached to the anterior three fourths of the membrana tympani, and the inner surface of this membrane was attached to the promontory by numerous strong, membranous bands. Below, the tumour had encroached upon the jugular fossa, and its lower part was in contact with the outer surface of the jugular vein.

When it is considered that this tumour had occupied a considerable portion of the cavity of the mastoid cells and tympanum, that it had destroyed one third of the membrana tympani, that it had caused absorption of the incus and of the crura of the stapes, and, lastly, that it was in contact above with the dura mater and below with the jugular vein, it will be well conceived how great must have been the irritation it produced, and how great is the probability that this irritation had caused an abscess in the brain. At the lower part of the meatus and near to the membrana tympani

was another sebaceous tumour, of about the size of a pea; it had produced a cavity in the bone, and had undermined the lower fourth of the membrana tympani.

Left ear.—There was a sebaceous tumour, about the size of a large pea, at the upper and inner part of the meatus; it also had caused absorption of the bone and of the upper and posterior third of the membrana tympani; it was in contact with the outer part of the head of the malleus and of the body of the incus.

Case 4.—J. B—, æt. 80, was brought to consult me in the early part of the year 1850; his health was good, but he was so hard of hearing that he required to be spoken to in a distinct voice within the distance of a yard from his head. He attributed his deafness to a cold which he had taken about three years previously.

Upon examination, the right meatus externus was observed to be filled with a grayish-white mass, which the patient declined to have interfered with; the right meatus externus was, to all appearances, in a natural state.

The patient died about a year after I saw him, and through the kindness of a friend I had the opportunity of dissecting the ears.

Dissection.—Right ear.—The external meatus was half as large again as natural, and was distended by a sebaceous tumour, which seemed to have pressed equally on all its walls. At the innermost part of the lower wall it had produced a small orifice in the bone, which allowed of a communication below the membrana tympani between the cavity of the meatus and that of the tympanum. By its pressure on the outer surface of the long process of the malleus it had caused its total absorption, the head of this bone alone remaining; it articulated with the body of the incus. The stapes was fixed in the fenestra ovalis more firmly than natural, and the otoconie was more abundant than usual.

Case 5.—*Sebaceous tumour extending through the petrous*

bone, and covered by the dura mater.—A man between seventy and eighty years of age had been hard of hearing for a considerable period previous to his death; no further history of the case had been ascertained.

Dissection.—Right ear.—The external meatus was considerably dilated, and was filled by a sebaceous tumour as large as a small hazel-nut. This tumour had made its way upwards, and had caused absorption of the upper and posterior half of the osseous wall of the meatus: it projected into the mastoid cells, from the cavity of which it was separated by the well-defined wall of the tumour. The tumour had also caused absorption of the upper and posterior part of the membrana tympani and of the body and posterior arm of the incus. The posterior third of the membrana tympani being pressed against the promontory, had become adherent to it by firm, membranous bands. A second tumour, about the size of a small pea, was found at the floor of the meatus near to the membrana tympani.

Left ear.—Meatus externus much dilated, and the whole of the inner and upper part was occupied by a sebaceous tumour, which had caused absorption of the osseous wall to the extent of three quarters of an inch in length and half an inch in breadth. The tumour extended into the mastoid cells posteriorly, and superiorly into the middle cerebral cavity. The outer surface of the tumour was in contact with the dura mater above, and with the mucous membrane of the mastoid cells posteriorly. The tumour had pressed the membrana tympani inwards, so that the tympanic cavity was reduced to one half of its natural size, and the other half of the membrana tympani adhered firmly to the inner wall of the tympanum. The pressure of the tumour had caused absorption of the whole of the incus, with the exception of the lower part of its long process, which was disarticulated from the stapes; the neck of the latter bone projected through an orifice in the membrana tympani. A smaller tumour, of the size of a millet-seed, was buried in the central part of the floor of the meatus.

CASE 6.—*Sebaceous tumours situated in each external meatus, one of those in the left ear being in contact with the outer surface of the jugular vein.*—A man who died at the age of sixty-seven had been hard of hearing for some time, and the tubes of the ear were supposed to be filled by wax, but no attempt at its removal was made by the surgeon in attendance, as the patient declined to allow any operation to be performed.

Right ear.—The orifice of the meatus was nearly twice as large as natural, and the whole of the meatus was greatly dilated. A sebaceous tumour filled the whole of its cavity, reaching as far as the membrana tympani. Upon its removal the bone forming the posterior and lower wall of the meatus was found to be rough and partially absorbed.

Left ear.—The external meatus contained three sebaceous tumours, one about the size of a pea, situated at the lower part of its orifice, and having caused absorption of the bone, which was rough and scabrous. A second tumour, half the size of the former, was situated at the posterior part of the meatus, about a line from the membrana tympani; it had caused absorption of the bone, and extended into the mastoid cells. The third tumour, about the size of a small pea, situated at the floor of the meatus, close to the membrana tympani, had slightly undermined that membrane; it had also caused absorption of the lower wall of the meatus, and was in contact, in the *fossa jugularis*, with the outer surface of the jugular vein; it had also caused absorption of the anterior wall of the meatus, an orifice of considerable size communicating with the *fossa parotidea*.

(B) *A Tabular View of the Symptoms and Morbid Appearances found on Dissection in Eighteen Cases of Sebaceous Tumours occurring in the External Auditory Meatus.*

No.	Sex.	Age.	Symptoms of Disease.	Post-mortem Appearances.	
				Right Ear.	Left Ear.
1	Female	24	Discharge from the right ear for five years; great pain in the ear and head during seven weeks, followed by giddiness, delirium, and double vision.	A sebaceous tumour at the posterior and outer part of the meatus externus extended inwards and backwards to the cavity for the cerebellum, then upwards to the cerebral cavity, and, lastly, downwards into the cavity of the tympanum, which it completely filled. There was a large abscess in the cerebellum adjacent to the tumour.	Normal.
2	Male	72	Pain in the ear and deafness for some months; discharge from the meatus during ten weeks. Symptoms of cerebral irritation for five weeks previous to his death.	A sebaceous tumour, the size of a large hazel-nut, distended the external meatus, which was also much dilated. The tumour projected upwards, causing absorption of the petrous bone, and it was in contact with the outer surface of the dura mater. There was an abscess in the lower part of the middle cerebral lobe directly above the tumour.	Normal.

XLIV.	3	Male	66	Pain in the right ear for a year, followed by discharge, headache, and giddiness. Nine days previous to death, was seized with vomiting, shivering, and inability to stand, followed by coma and paralysis.	Meatus full of a tumour which had extended through the upper wall of the meatus, and was in contact with the dura mater; it also extended backwards into the mastoid cells, and downwards to the fossa jugularis.	A sebaceous tumour, about the size of a pea, was attached to the upper and inner part of the meatus externus.
	4	Male	80	Hardness of hearing for about three years.	Meatus much dilated, and filled by a sebaceous tumour; it produced a communication between the meatus and the tympanic cavity below the membrana tympani. The long process of the malleus had been absorbed.	Normal.
	5	Male	72	Hardness of hearing for some years.	Meatus filled by a sebaceous tumour, the size of a small hazel-nut. The upper and posterior wall of the meatus absorbed, and the tumour projected into the mastoid cells. The upper and posterior part of the membrana had been absorbed. A second tumour, of the size of a small pea, was situated in the floor of the meatus, near the membrana tympani.	Meatus much dilated, and filled by a sebaceous tumour. The upper and posterior walls of the meatus absorbed, and the tumour projected upwards, being in contact with the dura mater, and backwards into the mastoid cells. The body of the incus had disappeared. A second tumour, of a small size, was seen on the floor of the meatus.
5	6	Male	70	Hardness of hearing for some years in the left ear.	The meatus contained three sebaceous tumours; one, the size of a small bean, at the lower part of the meatus near the orifice, the bone being rough and scabrous; the two other tumours were lodged in depressions of the bone, and were the size of millet-seeds.	Normal.

No.	Sex.	Age.	Symptoms of Disease.	Post-mortem Appearances.	
				Right Ear.	Left Ear.
7	Male	56	For some months pain at times in the left ear, accompanied by the presence of a tumour which filled the orifice; the hearing power much diminished.	The osseous meatus distended by a tumour measuring three quarters of an inch long and half an inch in breadth.	Normal.
8	Male	59	No history could be obtained.	A tumour, about the size of a pea, at the lower and outer part of the meatus.	A tumour, similar to that in the right ear, at the posterior and lower part of the meatus, near to the orifice. Upon its removal, the cancellous structure of the bone was exposed over a space measuring three quarters of an inch long and half an inch broad.
9	Male	41	Dulness of hearing in the right ear during many years.	The meatus externus was much larger than natural. At its upper and inner part, close to the membrana tympani, was a tumour the size of a small pea; it projected into the meatus, and also through the membrana tympani into the tympanum. The upper wall of the tympanum was perforated by several small orifices filled with blood.	Normal.
10	Male	60	Gradual deafness for eighteen months in the right ear; accompanying the deafness was a bumping noise in the ear.	A sebaceous tumour, the size of a pea, occupied the inner extremity of the meatus, above the membrana tympani. The adjacent bone was absorbed, together with the	Normal.

				upper part of the membrana tympani; the tumour extended into the tympanic cavity. The carotid canal was contracted, and the upper wall of the tympanum hypertrophied.	
11	Male	72	Deafness in both ears gradually coming on during several years. Noises in each ear like a buzzing rattling and roaring.	The meatus much dilated, and filled with a sebaceous tumour. The upper part of the meatus near to the membrana tympani perforated, and a communication existed between the meatus and the tympanic cavity. The upper wall of the tympanum was perforated by numerous foramina.	Normal, with the exception of a thickening of the membranous labyrinth.
12	Male	—	No history obtainable.	Normal.	Meatus greatly dilated, and filled by a sebaceous tumour. The osseous floor of the meatus very rough. There was a second tumour at the upper part of the meatus, near to the membrana tympani.
13	Male	60	No history obtainable.	Meatus much dilated by a tumour at the outer part of the meatus.	Normal.
14	Male	78	Deafness for several years in both ears.	Meatus much dilated by a sebaceous tumour in the upper and outer part of the posterior wall. It extended into the tympanic cavity through a circular orifice the size of a small pea, the margins of which are sharp and well defined, as if made by a chisel. A second tumour, of nearly the same size, situated at the upper part of the membrana tympani, projected through an orifice, partly in the bone and partly in the upper part of the membrana tympani, into the tympanic cavity.	A small tumour, at the upper and inner part of the meatus, projected through an aperture in the bone into the tympanic cavity.

No.	Sex.	Age.	Symptoms of Disease.	Post-mortem Appearances.	
				Right Ear.	Left Ear.
15	Male	67	Hardness of hearing, supposed to be dependent upon the presence of hardened cerumen.	Meatus dilated by a sebaceous tumour, which had caused a roughness of the bone at the lower part of the meatus.	Meatus greatly dilated; a large sebaceous tumour, situated at its orifice, had destroyed the lower wall of the meatus. A second tumour, situated at the posterior and inner part of the meatus, had caused an aperture communicating with the mastoid cells. A third small tumour at the floor of the meatus, near the membrana tympani, had caused absorption of the bone; the tumour was separated from the jugular vein by a thin membrane only.
16	Male	56	Subject to a discharge from the left ear during some years; small portions of bone had been extruded at various times.	Normal.	A tumour, the size of a large horse-bean, near the orifice of the meatus, had caused absorption of the bone. A second tumour, much smaller, at the posterior part of the membrana tympani, had produced an aperture communicating with the mastoid cells.
17	Male	50	Deafness in the left ear during some years.	Normal.	A large sebaceous tumour on the floor of the meatus, near the orifice, had caused considerable roughness of the bone.
18	Male	60	Deafness in the left ear during some years.	Normal.	A sebaceous tumour, the size of a large pea, situated at the upper and back part of the membrana tympani, had caused absorption of the latter membrane and the adjacent bone, and projected into the tympanic cavity, pressing the incus inwards towards the promontory, and dislocating it from the head of the malleus.

(c) *Cases treated successfully.*

The two following cases indicate the mode in which the disease may be advantageously treated.

CASE 19.—*Sebaceous tumour in the right ear, accompanied by pain and deafness; removal; cure.*—Mr. F—, æt. 45, consulted me in the year 1854 on account of pain in the right ear and side of the head, attended by copious fetid discharge and deafness. He stated that during several months he had experienced an uncomfortable sensation of fulness in the ear, which had terminated in deafness; and that within the last two months the pain had greatly increased, and the discharge had appeared, and had become constant, without affording any relief to the pain. Upon examination the meatus was observed to be distended by a large grayish mass, from which a milky fluid oozed. By the aid of the syringe and warm water a considerable quantity of this discharge was removed, together with large white flakes. The interior of the tumour, which could now be examined, was seen to consist of white layers; some of these were withdrawn by the aid of the lever-ring forceps.

Two days afterwards the cavity was again full of discharge and white flakes; these were removed in the same way as before. By thus using the syringe and lever-ring forceps the mass of the tumour was removed, and ultimately the firm wall of the tumour was withdrawn. The latter operation was followed by a diminution of pain, the discharge slowly subsided, and in a fortnight the patient wholly recovered, and I believe that he has had no return of the disease.

CASE 20.—*A sebaceous tumour in the right ear, attended by great pain and discharge; removal; cure.*—C. W—, a gentleman, æt. 54, consulted me in the month of July, 1860, on account of violent pain in the right ear and side of the head, accompanied by discharge. The origin of the affection

was stated to be a cold, supervening upon an attack of scarlet fever at four years of age. From that period until eighteen years of age, during the spring easterly winds he had attacks of earache, sometimes in one, at others in both ears; each attack commonly terminated in discharge. Between eighteen and twenty-four there was an intermission of the attacks, but at the latter age deafness began to be manifest. At twenty-seven another attack of pain occurred in the right ear; the suffering was intense, and lasted several hours, and terminated in the exfoliation of a small piece of bone. These attacks recurred at various times, and were always accompanied by copious discharge of glutinous matter, and very often of a tough, whitish substance, something like gristle. In the intervals of these severe attacks a soreness was experienced in the ear, accompanied by throbbing and by noises like the rushing of water, hissing, and singing. The late Mr. Pilcher attended the patient in some of these severe attacks, and removed considerable portions of a white substance from the ear.

At the time of my seeing the patient, the right outer meatus was closed by the presence of a large white tumour, the interior of which was exposed and poured out an offensive discharge. By the aid of the syringe and warm water some flaky matter was removed, which did not, however, in the least degree diminish the pain in the ear and side of the head; these symptoms, however, completely subsided on the removal of a large mass of yellowish-white material which, upon examination, proved to be a sebaceous tumour.

Fig. 1.

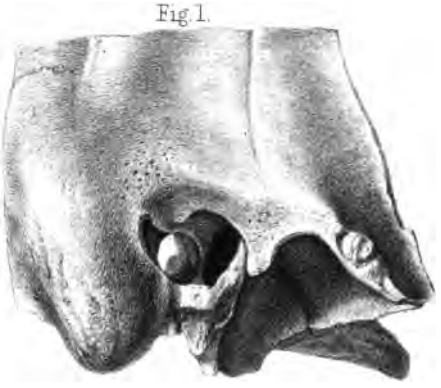

Fig. 2.

Fig. 3.

Fig. 4.

DESCRIPTION OF PLATE I.

Fig. 1.—An aperture produced by a sebaceous tumour in the outer part of the meatus auditorius externus, and communicating with the cerebellar cavity.

„ 2.—The effects of the tumour on the posterior and upper surfaces of the petrous bone.

„ 3.—The external meatus greatly expanded by a sebaceous tumour.

„ 4.—The upper osseous wall of the meatus perforated by the tumour.

DESCRIPTION OF PLATE II.

Fig. 1.—The whole of the upper and posterior wall of the external meatus, and the upper and posterior part of the membrana tympani, destroyed by a sebaceous tumour.

„ 2.—A sebaceous tumour *in situ;* the external meatus being expanded.

„ 3.—An aperture in the upper and posterior wall of the meatus, communicating with the mastoid cells, produced by a sebaceous tumour.

Fig 1

Fig. 2.

Fig. 3.

FURTHER OBSERVATIONS

ON THE

STRUCTURE AND TREATMENT

OF

UTERINE POLYPI.

BY

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UNTIL a recent period, the anatomical structure of the different varieties of uterine polypi was very imperfectly understood; and at the present time uterine polypi continue to be confounded by many writers with the cancerous or malignant diseases of the uterus.

In 1696, Saviard examined the body of a woman who had died of uterine hæmorrhage in the Hôtel Dieu. He found a fleshy mass, as large as the heart of an ox, adhering to the fundus uteri, and filling its cavity. This tumour, which had a slender neck or root, was covered with a membrane which appeared to be an expansion of the lining membrane of the uterus. Four branches of arteries and veins were distributed to the tumour. The arteries were small, but the veins were as large as the crural veins; and when the tumour was laid open, a considerable cavity was found in its centre, extending from the apex to the base. The lower extremity of the tumour had a contused and gan-

grenous appearance, and Saviard believed that the hæmorrhage which had destroyed the patient proceeded from the veins.

He has offered no opinion respecting the origin and nature of this tumour, or attempted to explain how it came to be situated beneath the lining membrane of the uterus; and the state of morbid anatomy at the time he lived rendered it impossible for him to explain what he so accurately described. Saviard does not appear to have suspected that this tumour might have passed through the os uteri into the vagina, and become a polypus, similar to those described by Ambrose Paré, Bartholomy, Mauriceau, and subsequent writers.

A woman died at Orleans, in the ycar 1746, who had a tumour hanging from the vagina, which was supposed to be cancerous. Monsieur Levret examined this tumour after death, and found it similar in structure to the tumour described by Saviard. It contained arteries and veins, and was covered on the outer surface by an expansion of the membrane which lined the inner surface of the uterus. A great number of varicose veins were observed on its surface. On laying open the tumour, no other cavities were perceived in it, except those of some blood-vessels, the largest of which did not exceed the fourth of a line in diameter. In colour and consistence, the tumour resembled cow's udder boiled.

Fibrous tumours or fleshy tubercles of the uterus were first described by Dr. William Hunter, but it does not appear that he had observed any of these tumours which had passed through the os uteri into the vagina, and become what have usually been termed uterine polypi.

The similarity of structure between fibrous tumours of the uterus and uterine polypi appears first to have been pointed out by Dr. Baillie; and many eminent writers on the diseases of women have since referred to the statements of Dr. Baillie, and inferred that all the different varieties of uterine polypi are fibrous tumours, or, as they are now termed by some authors, "fibroids of the uterus."

"When cut into," says Dr. Baillie, "it shows precisely

the same structure as the tubercle of the uterus just described; so that a person looking on a section of the one and the other, out of the body, could not distinguish between them. This sort of polypus varies very much in size, some not being larger than a walnut, and others being larger than a child's head. It adheres by a narrow portion or neck, which varies a great deal in its size and in its proportion to the body of the polypus. The largest polypus I ever saw was suspended by a neck hardly thicker than the thumb; and I have seen a polypus, less than the first, adhering by a neck fully as thick as the wrist. . . . The place of adhesion also differs considerably. It is most commonly at the fundus uteri, but it may take place in any other part; and I have seen a small polypus adhering just on the inner lip of the os uteri. When a polypus is of any considerable size, there is generally one only; but I have occasionally seen on the inside of the uterus two or three small polypi, and in some instances several polypi have been known to grow from the uterus in succession.

"Another sort of polypus," continues Dr. Baillie, "forms in the uterus, which consists of an irregular bloody substance, with a number of tattered processes hanging from it. This, when cut into, exhibits two different appearances of structure: the one appearance is that of a spongy mass, consisting of laminæ, with small interstitial cavities between them; the other is that of a very loose texture, consisting of large irregular cavities."

It does not admit of a doubt that Dr. Baillie has here described, under the term polypus, two diseases essentially and widely different, and not admitting of the same treatment. The polypus first described was a simple fibrous tumour of the uterus, covered by the lining membrane and a layer more or less thick of the muscular coat; but the second has all the characters of malignant or cancerous growths of the organ.

In a paper "On Fibro-Calcareous Tumours and Polypi of the Uterus," published in the nineteenth volume of the 'Medico-Chirurgical Transactions,' I observed that,

"though the facts which have now been stated, clearly demonstrate that the greater number of uterine polypi are fibrous tumours which have been formed under the lining membrane and a stratum of muscular tissue, we are not entitled to conclude, as some have done, that these are the only tumours which make their way from the cavity of the uterus into the vagina, and which are not of a malignant nature. There is a tumour of the fundus or body of the uterus which grows occasionally from its mucous membrane, or is formed by a morbid change of the mucous membrane itself, which does not acquire a large size, but which seems to be analogous to the common polypus tumour which is formed in the cavities of the nose. It has a broad base and flattened form, and in some cases is largely supplied with blood-vessels.

"There is still another tumour," I observed, "formed under the lining membrane of the uterus, whose structure is peculiar, and differs from any of the preceding. It consists of a congeries of small vesicles or cysts, filled with a clear or yellowish-coloured ropy fluid, which cysts are embedded in a soft fibrous substance formed under the lining membrane of the uterus. Five examples of this disease have come under my observation, and in all the tumour was situated under the lining membrane of the uterus, which was very thin and highly vascular.

"A fourth variety of tumour of the uterus, to which the term polypus has also been applied by writers, is produced by a morbid enlargement of the glandulæ or ovula Nabothi. One of these bodies is sometimes converted into a cyst as large as a walnut, or even a hen's egg, and hangs by a slender peduncle from the cervix or lip of the os uteri. It is smooth and vascular, and contains in some instances a curdly or yellow-coloured, viscid fluid. The tumour produces great irritation, and gives rise to copious sanguineous discharges from the vagina.

"To these four distinct varieties of tumours of the uterus, none of which are malignant in their nature, and to which the term polypus has been applied, ought perhaps to

be added that variety of tumour of the uterus which consists of erectile tissue, or of cells and dilated arteries and veins."

In a supplement to this paper, published in the 'Medico-Chirurgical Transaction' in 1850, I described the manner in which the circulation of the blood is carried on throughout the substance of fibrous tumours of the uterus, and demonstrated that, like the walls of the uterus, they are everywhere pervaded by arteries and veins.

To illustrate the structure and varieties of uterine polypi, without a knowledge of which it appears impossible that their treatment can be conducted in a scientific manner, a series of preparations and drawings is now placed upon the table of the Society.

In the paper now referred to, I observed that "when any of these tumours pass through the os uteri into the vagina, they may be removed by the ligature or the knife. If the root is soft and slender, the tumour may easily be twisted off with the forceps. In the course of the last twenty years Dupuytren states that he has removed two hundred uterine polypi by excision. Hæmorrhage occurred twice in all the cases, and in both instances it was permanently arrested by the tampon. In eight or ten cases after the application of the ligature, death took place from the absorption of pus into the system. Where the root of the tumour is large and thick, I am of opinion that a ligature should previously be passed around it, at as great a distance as is compatible with the removal of the disease."

The histories of forty cases of polypus of the uterus are contained in my 'Clinical Reports of Ovarian and Uterine Diseases,' published in 1853. Respecting the results of the treatment adopted in these cases, a recent writer has made the following statement:

"That out of twenty cases of removal of fibrous polypus by ligature, recorded by a most strenuous defender of that operation—Dr. R. Lee—nine, or more than one in three, had a fatal result; a mortality more than double that of the operation of lithotomy, as high as that which occurs in

placenta prævia, and higher than the mortality from malignant cholera."[1]

The truthfulness of this statement will be speedily judged by those who will take the pains to read this communication attentively.

I have now the honour of presenting to the Royal Medical and Chirurgical Society a history of 105 cases of uterine polypi, reduced into a tabular form, in which the date, name, age, and social condition of the patients are recorded, and the symptoms, treatment, and result are given. All the cases of polypus of the uterus which have ever come under my observation, fortunate and unfortunate, are contained in this table.

In three of these 103 cases no operation was performed, and the result was not known. In two of the remaining 100 cases the polypi disappeared spontaneously, by some process the nature of which was not ascertained. One of these (No. 94) occurred in St. George's Hospital, and the polypus was not only felt partially protruding through the os uteri, but seen.

Of the ninety-eight cases which remained, five died before any attempt had been made to remove the polypi by ligature or by any other means. The first of these (No. 2) occurred in the Middlesex Hospital, and the nature of the disease was not ascertained until the body was examined after death. In the second (No. 4) the patient died in the Fever Hospital, without any operation having been performed. In the third (No. 5) the patient died, under the care of Dr. Sims, in St. Marylebone Infirmary, from uterine hæmorrhage and the usual symptoms of cancerous disease of the uterus. In the fifth (No. 85) I had resolved to apply a ligature around the root of the polypus; but the patient, who was under the care of Mr. Barnes, died before the operation was attempted. A preparation of the uterus, with the fibrous

[1] 'Lectures on the Diseases of Women,' by Charles West, M.D., &c., 1856, p. 324.

polypus adhering to the fundus, is now placed upon the table of the Society, with two correct drawings by Mr. Arthur Roberts, the present obstetric assistant at St. George's Hospital.

After deducting these ten cases there remain ninety-three, of which eight died, and eighty-five recovered.

By referring to the condensed history it will be seen that, in the first of these fatal cases (No. 7), the patient in the St. Marylebone Infirmary was moribund when Mr. Perry, with the sanction of Dr. Sims, applied the ligature around the root of the polypus, which hung externally, and that she died the same evening. The preparation, with a drawing which has been figured in the 'Medico-Chirurgical Transactions,' are now placed upon the table of the Society. I did not see the patient during life, and was not present at the post-mortem examination; but, nevertheless, this case is the first which has been adduced, by the writer above referred to, to support the conclusion "that, out of twenty cases of removal of fibrous polypus by ligature recorded by me, nine, or more than one in every three, died." The polypus is still seen hanging from the uterus, and has been laid open to show its structure, but has not yet been removed; and there is no visible mark on the root of the polypus of the ligature ever having been applied.

In the next fatal case the ligature was applied around the root of a large sloughing polypus, which was hanging externally.

In Case 11, Mr. Cæsar Hawkins endeavoured to bring down the tumour, which had only passed through the os uteri partially, with a pair of forceps into the vagina; but not succeeding in the attempt, operated, and the polypus was removed by the ligature. Death took place in this case from peritonitis.

In Case 16, the patient was under the care of Mr. Tatum in St. George's Hospital, and she died from peritonitis before the root of the polypus had been divided by the ligature. The preparation is now placed upon the table of the Society. I did not see this patient during life; but this is another of

the cases which have been adduced to prove that the mortality in my cases of uterine polypi has been "double that of lithotomy, as high as that which occurs in placenta prævia, and higher than the mortality from malignant cholera.

By an examination of this condensed history of 103 cases of uterine polypi it will be seen that, of the last fifty cases which have come under my own care, and in which the operation for the removal of the polypi has been performed by me, not one patient has died. The various methods of treatment, having been minutely described in the histories of the cases, do not require to be again detailed.

Being fully aware that the greater number of large uterine polypi are fibrous tumours covered with the lining membrane and a portion of the muscular coat, and that these polypi have large arteries and veins distributed throughout their substance, in operating upon them I have not ventured to drag them out of the vagina with forceps of any kind, and divide their roots with the knife. The ligature has usually been applied in such cases with the bent rod, and the sloughing polypus has been removed when the ligature was long in dividing the root. By this means all the evil consequences which could be produced by the vagina being long filled with a putrid mass have been completely avoided; and to this course I do think may be attributed, in a great degree, the uniform success of operations performed by me of late. Even when the polypi have been of comparatively small size, and the ligature has been applied with the double canula, I have not considered it safe to leave the ligature many days around the root of the polypus, when the circulation through the substance had been destroyed, and the mass of the tumour was in a sloughing condition. By twisting the canula firmly round, the ligature has frequently passed through the root, and the polypus has been removed several days before this would have happened if the ligature had been merely tightened. Even in cases where the root of the polypus has not yielded to this treatment, the ligature has been removed, and the dead

polypus has come away harmlessly after some days, tepid water having been freely injected into the vagina. In all cases it has appeared of the utmost consequence to watch the condition of the uterine organs and of the general system, as it has been clearly proved that inflammation is the most common cause of death after the application of a ligature around the peduncle of a polypus.

A Table of 103 *Cases of Uterine Polypi.*

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
1	1827	Jane Kingston, St. George's Hospital	43	Single; one child	Health much impaired; skin of a sallow colour; constant pain and sense of heat in the region of the uterus; irritation about the neck of the bladder; constant yellow discharge from vagina, and occasional hæmorrhage during ten weeks. Catamenia regular until two years ago. Complains of strong pulsation about the umbilicus. Pulse 100; bowels costive; stomach weak; tongue coated; much thirst. Has been cupped on the loins, and used the warm bath, and first injections of oak bark. Venesection; blood buffed; pain in the uterus relieved. There is a polypus of considerable size dilating the os uteri; no attempt made to remove this.	Not known with certainty.
2	Dec. 21, 1829	—— Middlesex Hospital, Dr. H. Ley	Middle	Married; not known if she had ever been pregnant. Had led an irregular life, and there was a suspicion that some violence had been inflicted upon her three nights before	Admitted into the Middlesex Hospital in an exhausted and almost insensible state, with a large globular-shaped tumour hanging by a thick root out of the vagina between the thighs. Three pints of urine in the bladder. The surface of the tumour partially covered with coagulated blood, and it was painful when touched. It was at first supposed to be the uterus inverted, and attempts were made without effect to reduce it. Afterwards, from a depression in the lower part of the tumour, it was supposed to be a case of prolapsus uteri, and leeches and fomentations were applied to facilitate its reduction within the pelvis; abdominal inflammation ensued, and she died on the 31st of December. Body examined on the 1st of January, 1830. The tumour, which still hung externally, was found to be a large polypus, attached by a thick root to the anterior part of the cervix uteri. The surface of the tumour was covered by a smooth membrane, reflected over it from the mucous membrane of the uterus, with which it was continuous. The uterus was dragged low down into the vagina, but its structure was healthy. The ovaria were enlarged and partially destroyed with inflammation.	Died; no attempt was made to remove the polypus by an operation during life.

3	Sep. 20, 1830	A patient of Dr. H. Ley	Uncertain	Married	Uterine hæmorrhage and irritation; loss of strength. A small, soft, flattened polypus, with a slender root, encircled by the os uteri. A ligature was easily applied with a double canula, by Dr. H. Ley, and the polypus came away two or three days after. It had a white fibrous structure, in all respects similar to the fibro-cartilaginous tumours of the uterus. This case strongly confirms the opinion that most uterine polypi are the fibro-cartilaginous tumours developed under the lining membrane of the os uteri.	Recovered.
4	Feb. 3, 1830	—— London Fever Hospital	—	Not known	The late Mr. John Wood presented to me the uterus and appendages of a woman who had died in the Fever Hospital. A tumour about the size of a large walnut, tense and smooth, and covered with the lining membrane of the cervix uteri, was hanging in the upper part of the vagina. Its neck was soft and slender, and passed into the cavity of the uterus. On cutting into this small polypus, it was found to be a cyst filled with a thick, yellowish curdly, matter. Two small tumours of the same nature were seen adhering to the inner part of the cervix by soft slender roots. The existence of these tumours was not known during life. They have been accurately delineated in the 19th vol. of the 'Medico-Chirurgical Transactions.' Two enlarged glandulæ Nabothi in the cervix.	Died from typhus fever.
5	Feb. 6, 1832	A patient, under the care of Dr. Sims, St. Marylebone Infirmary	44	——	Died in the St. Marylebone Infirmary with uterine hæmorrhage, and the usual symptoms of cancerous disease of the uterus, under the care of Dr. Sims. From the inner surface of the fundus uteri there hung by a soft slender root a tumour of a pyriform shape, the greater part of which had passed through the os uteri and filled the upper part of the vagina. The tumour was covered by a thick membrane continued from the lining membrane of the uterus. A dense fibro-cartilaginous tumour formed the centre of the polypus; the membrane covering the stalk was perfectly smooth, but that portion covering the most depending part of the polypus was soft, and partially destroyed by ulceration and sloughing. A fibrous tumour, an inch in diameter, was imbedded in the muscular tissue of the uterus, near the root of the tumour, filling the vagina, which it strongly compressed; there was another under the membrane of the fundus. When the uterus was laid open, its cavity contained a considerable quantity of coagulated blood. See a delineation of the preparation in Plate VIII, figure 1, in my 'Pathology of the Uterus.' So completely did this polypus fill the upper part of the vagina, that the os uteri could not be touched.	Died without any operation having been attempted to be performed.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
6	Aug. 18, 1832	—— St. Marylebone Infirmary, Mr. Hutchinson and Dr. Hope	59	——	Had suffered upwards of two years from frequent attacks of uterine hæmorrhage, and in the intervals from a fœtid, serous, and purulent discharge. Countenance sallow and pallid, and strength greatly reduced. A tumour, covered with a smooth membrane, and having a slender pedicle, surrounded by the os uteri, filled the vagina; the anterior lip of the os uteri was hard and irregular, as if ulcerated, and the posterior thick and projecting. A ligature was applied by me, with a double canula, around the root of the polypus. On tightening the ligature a considerable discharge of blood took place from the vagina the day after; the catheter was required the two following days after, when the ligature came away with the polypus. The patient recovered in the most satisfactory manner from the operation; but symptoms of disease of the heart appeared not long after. The polypus was covered with a smooth membrane; under this membrane in different parts were small quantities of extravasated blood. The polypus was sent to Dr. Hope.	Recovered.
7	Nov. 26, 1833	A patient in the St. Marylebone Infirmary, under the care of Dr. Sims and Mr. Perry	47	——	A woman, supposed to be labouring under ascites, and much exhausted by hæmorrhage from the uterus, was brought into the St. Marylebone Infirmary. A few days after her admission it was ascertained by Dr. Sims and Mr. Perry, under whose care she was placed, that there was a globular-shaped tumour, larger than the fœtal head at the end of the ninth month, hanging out of the vagina. The tumour resembled at first a prolapsed uterus; but when the finger was passed into the vagina, it was found to be connected with the anterior lip of the uterus by a short root of considerable thickness. The surface of the tumour was of a dark livid colour, and had a sloughing gangrenous appearance in several parts. The woman was so enfeebled in body and mind, that she could not communicate a distinct account of her complaints, and the precise period when the tumour appeared externally could not be ascertained. She stated that she had suffered for several years from profuse discharges of	Died.

blood from the vagina, and that at different periods a tumour had protruded, which she had always succeeded in returning within the parts by pressure. Dr. Sims and Mr. Perry being of opinion that the removal of the tumour by the ligature afforded her the only chance of relief, Mr. Perry immediately performed the operation with the double canula. She suffered little pain after the ligature was tightened. Twenty-five minims of laudanum were given, and she appeared to be going on well till the evening, when she began to sink, and died in less than twenty-four hours from the time when the ligature was applied. A large cyst, containing several pints of fluid, was found adhering to the left ovarium; there were several small cysts in the right ovarium. The uterus and vagina were healthy. To the anterior part of the cervix a large hard tumour, flattened on the anterior and posterior surfaces, was found attached by a thick, short peduncle, in which was a slight depression from the ligature. The tumour was invested by a membrane, which was continued from the lining membrane of the uterus. A yellowish-coloured exudation of lymph, which readily peeled off in flakes, partially coated the surface of the tumour; and when pressure was made, blood oozed out from numerous small openings. The root of the tumour was half an inch in length and one inch in diameter, extremely dense, and of a red fleshy appearance, like the muscular coat of the gravid uterus. Numerous large blood-vessels, resembling the sinuses of the gravid uterus, filled with coagula, were seen in the peduncle and in a considerable part of the substance of the tumour. The tumour, when first laid open, had a dark livid colour, like serous blood. Its structure was not uniform. In the most depending part of the tumour was a mass which had the appearance of a common fibrous tumour of the uterus. The root and a great portion of the tumour surrounding the firm nodule had a different structure; they resembled the muscular coat of the uterus, and to all appearance were formed by a continuation of this tissue. Numerous large vessels, resembling the sinuses of the gravid uterus, also traversed this portion of the tumour, as well as its root. The preparation has been delineated in the 19th vol. of the 'Medico-Chirurgical Transactions.'

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
8	Dec. 4, 1833	—— St. Marylebone Infirmary	—	——	Mr. Perry sent me a polypus of the uterus, which he had removed by excision from the os uteri. Its shape and size resembled the human ovum at the end of the second month. It was covered by a membrane of a deep red colour, which was thin in some parts and in others thick and soft. When cut into, the polypus had a fibrous appearance, was of a bluish colour, and in one part of it there was a solid coagulum of blood. Its interior did not present the appearance of the common fibrous tumour; it was soft and fibrous, and had the appearance of a solid, bluish, gelatinous matter. Dr. Sims was of opinion that it was not a fibrous tumour of the uterus.	Recovered.
9	July 31, 1834	—— under the care of Mr. Balderson	35	Single	Menorrhagia during two years, and habitual leucorrhœa with great irritation of the uterus. There was a red, soft, irregular-shaped, flattened tumour, the size of a large fig, hanging out of the vagina by a long slender peduncle, which was attached to the posterior part of the cervix uteri. A distinct pulsation was felt in the root of the tumour, the surface of which was covered with a fine membrane, under which were seen numerous large veins. The polypus was not unlike a portion of placenta or the uterine surface. A strong silk ligature was passed twice firmly around the root of the polypus with the double canula, and the tumour was cut off with the scapula; no hæmorrhage followed, and in three days the ligature fell off. Numerous orifices of blood-vessels were seen in the root of the tumour after its excision, from which blood escaped freely on pressing the tumour. The polypus, when laid open, presented the appearance of the corpus cavernosum.	Recovered.
10	June 10, 1836	E. Porter, under the care of Dr. Seymour & Mr. Cutler, St. George's Hospital	22	Single	Pale, sallow complexion; dyspepsia; pain in the spine; constant discharge of blood from the vagina. A tumour, the size of a small hen's egg, was found growing from the left side of the orifice of the uterus. Os uteri healthy. 10th.—Examined with the speculum along with Mr. Cutler, who is to remove the tumour in a few days, I saw the surface of the tumour very clearly. It was covered with a vascular membrane, through which could be seen a number of vesicles or cysts, filled with a clear fluid. It is obviously the same disease as	Recovered.

					that of which I have a drawing and preparation, and which I have called the cystic tumour of the uterus. 16th.—Mr. Cutler applied a ligature around the neck of the tumour, and having drawn it down through the external parts, cut the root with a pair of curved scissors. No hæmorrhage followed.	
11	Nov. 19, 1836	—— Mr. Cæsar Hawkins, St. George's Hospital	46	Married; two children	Excessive menorrhagia. A tumour, firm, hard, and smooth, felt hanging by a thick root, partially through the os uteri into the vagina; the peduncle was completely encircled by the os uteri. Through the speculum, the surface of the tumour was seen covered with a fine, smooth membrane. Mr. Hawkins endeavoured to bring down the tumour out of the vagina with a pair of forceps with sharp hooks at the extremity of each blade; but the instrument tore the tumour, though used in the most cautious manner, but by no efforts could it be brought down sufficiently low to reach the root, so as to divide it safely with the hand or scissors, the root of the tumour being very thick and short. A ligature was then applied around the tumour with the double canula. The ligature was tightened daily. On the 27th, the ligature and tumour came away; but the patient subsequently died from extensive peritonitis. A portion of the tumour only had come away, the remainder being intimately connected with the walls of the uterus.	Died from peritonitis.
12	August 1, 1837	F. Holmes, 1, Providence Court, Grosvenor Square	50	Married; one child twenty-six years before	The catamenia had ceased seven years. The uterus was completely prolapsed; and a small smooth polypus was seen growing from the cervix uteri. There were no blood-vessels visible upon its most dependent part, but there were some upon its pedicle. The polypus was easily removed, but by what means is not stated in my journal. The prolapsus of the uterus was reduced, and the patient recovered completely.	Recovered.
13	July 3, 1838	Mrs. S—, Ogle Mews, Dr. Walker	38	Marrried, and has had children	At Christmas supposed she was five months pregnant, seized with uterine hæmorrhage, and pains like those of labour, a few days before I saw her. Before this time, she had suffered from nausea and pain of the abdomen, accompanied with great debility. The whole vagina was filled with a smooth pyriform tumour, the size of a large hen's egg, the root of which was completely surrounded by the os uteri, which was in a healthy condition. The finger could be passed some distance within the os uteri, so as to feel the peduncle of the polypus all round, and which was very thick. There was reason to believe that the tumour was growing from the fundus uteri. A strong ligature was applied by me with a double canula, and it was firmly tightened twice daily and in a few days the ligature and the polypus in a decomposed state came away, and the patient recovered most favorably.	Recovered.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
14	Sept. 14, 1839	Mrs. —, Kensington, with Mr. R. Brown	70	Married; children	Hæmorrhage from the uterus. Eight years before, was reported to have a small polypus of the uterus removed by ligature. Os uteri close to orifice of the vagina; the anterior lip elongated, and projecting an inch and a half beyond the posterior, which led the medical attendant to suppose that there was another polypus. Dr.— was called to see the patient, when I refused to apply a ligature around the elongated anterior lip. He seized the lip with a pair of forceps, drew it completely out of the vagina, and cut it away with a pair of scizzors. No harm followed.	Recovered.
15	Sept. 9, 1840	—— Saint Marylebone Infirmary, with Mr. Stafford.	50	——	Long suffered from uterine hæmorrhage and constant discharge in the intervals, and sense of bearing down. There was a polypus in the vagina, of large size, covered with a smooth membrane. Tumour so large that the os uteri could not be felt. An unsuccessful attempt was made to apply a ligature around the polypus with a double canula. An attempt was then made to drag the polypus out of the vagina with a pair of forceps having sharp hooks; this was equally unsuccessful, and was followed by great hæmorrhage, the polypus having been extensively torn. After several trials with a bent rod, a strong whipcord was passed around the polypus, at what distance from the os uteri it was not possible to determine; on the 17th the ligature and canula came away. The polypus, in a half-putrid state, was afterwards with some difficulty drawn out of the vagina with a sharp hook and a pair of lithotomy forceps. The discharge gradually ceased, and some years after I saw the patient in a state of perfect health.	Recovered.
16	March 3, 1841	—— St. George's Hospital	47	——	Was admitted into St. George's Hospital with a polypus in the vagina, the size of a large orange, growing from the anterior part of the cervix and os uteri by a peduncle of considerable thickness. Mr. Tatum applied a ligature, with difficulty, around its root with the double canula. On the 2nd March, the discharge was extremely fœtid, the pulse was rapid, the breathing laborious, and there was urgent sickness. The ligature, on being tightened, broke, and a fresh ligature was applied by the house-surgeon. Death took place in this	Died from peritonitis.

					case with the ligature still around the root of the polypus. The preparation of the parts will be placed on the table of the Society, with a drawing.	
17	March, 1841	A lady, under the care of Dr. Scott	70	Married	Uneasiness about the sacrum for some time, and irritation about the neck of the bladder and thighs; a coloured discharge from the vagina. There were two small polypi hanging through the os uteri, which was high up. Vagina contracted. The largest polypus was a fibro-cellular tumour, which was easily twisted off with the forceps. The root of the former was so firm that it was destroyed with great difficulty. No hæmorrhage or unfavorable symptom followed.	Recovered.
18	April 27, 1841	A lady, under the care of Dr. Scott	50	Married	There was prolapsus uteri, and a small polypus hanging from the orifice. The os uteri was near the ostium vaginæ, and a small polypus was seen growing from the inner surface of the anterior lip; it had a thick root. Dr. Scott applied a ligature around the root, and on the second day cut off the tumour, and the patient recovered favorably.	Recovered.
19	Aug. 31	E. F—, St. George'sHospital	49	Married; one child twenty-five years before	During two years irregular sanguineous discharges from the vagina, with pain in the region of the uterus; feet and ankles swollen; sickness of stomach; general debility; distension of the abdomen. A polypus, like a small pear, with a smooth, slender neck, encircled by the os uteri in the vagina. Mr. Keate applied a ligature with the double canula, and in a few days the polypus and ligature came away, and the patient soon left the hospital, restored to health.	Recovered.
20	March 16, 1842	——	60	Married; sterile	Had long suffered from profuse discharges of blood from the vagina. Supposed by her medical attendant to have prolapsus uteri. There was a large fibrous polypus, in a half-decomposed condition, hanging out of the vagina. Extreme fœtor of the discharge; external parts inflamed and excoriated. On the 16th I applied a strong ligature around its root, and cut away the sloughing mass. No hæmorrhage followed. On the 17th there was a severe rigor. On the 18th, the pulse rapid, the tongue furred, and there was drowsiness. On the 21st the ligature had come away, the offensive discharge had nearly ceased, and there was every prospect of a rapid recovery. In a few days, sore throat came on, with aphthæ over the whole inner surface of the mouth. The symptoms gradually became more unfavorable, and she died ten days after, with constant vomiting and other symptoms which are usually believed to arise from the introduction of some poison into the system.	Died.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
21	April 16, 1842	A lady, with Mr. Cathrow	50	Married; no children	Had suffered long from pain in the back, and hæmorrhage between the monthly periods. Mr. Cathrow had ascertained that there was a polypus of the uterus, not larger than a walnut, soft and smooth, with a slender neck, surrounded by the os uteri, which was thick and hard. On the 19th, I passed up two fingers of the left hand to the polypus, and sliding the forceps along the groove formed by these, seized and tore it away. A portion of the root was left behind; and to remove this, it was necessary to re-introduce the forceps, and some difficulty was experienced in getting the root perfectly extirpated.	Recovered.
22	May 29, 1842	—— With Dr. William Jones	42	Married; several children	Had for a considerable period been suffering from irregular sanguineous and serous discharges from the uterus, with uneasiness within the pelvis, and great nervous disturbance. Supposed to be pregnant, and that a miscarriage was about to take place. To promote this, ergot and emetics had been administered. On the 22d of June, Dr. Jones was permitted to make an examination, and he detected a polypus, the size of a small pea, with a slender neck. A ligature was easily applied with a double canula. In a few days the polypus came away, and the patient recovered most satisfactorily.	Recovered.
23	1843	Mrs. F—	28	Married	Had suffered some time from repeated discharges of blood from the uterus. Complexion dusky. A large, fibrous polypus in the vagina, softer in some parts than in others, and covered with a smooth membrane. The os uteri was felt around its root at the fore part, but not behind. The ligature was applied without any difficulty, and tightened twice daily, and the ligature and polypus soon came away. Recovery perfect. A fibrous tumour formed the central part of the polypus.	Recovered.
24	May 1, 1843	Mrs. C—. Mr. Cocke	30	Married; children	Delivered about two weeks before of her second child. During her pregnancy the left side of the abdomen had been unusually large and painful. A	Recovered without an opera-

					week after her confinement had pains like those of labour, without any hæmorrhage. Mr. Cooke examined and found a mass not unlike the placenta, not only filling the vagina, but hanging out of the external parts. This presented all the appearances of a vascular fibrous tumour. The whole upper part of the vagina was filled with an irregular, ragged mass, the root of which I felt adhering to the os uteri. No hæmorrhage followed, and she gradually regained her health. At the end of May, 1847, she was delivered of her third child. Some weeks after an examination was made, and a large, soft tumour was felt partially dilating the orifice of the uterus, and apparently filling its cavity. I recommended that no attempt should be made to remove this tumour until it had passed through the os uteri. This advice was not followed, and the patient died some time after, but whether from an operation performed by a practitioner, or disease, I never could ascertain with certainty, the circumstances having been successfully concealed.	tion. Subsequently died.
25	Nov. 17, 1845	Mrs. —, Wimbledon. Mr. Fane	56	Married; several children	Violent uterine hæmorrhage five weeks before. It had been ascertained before I saw the patient that there was a large polypus in the vagina, with a very thick and short root. I found a fibrous polypus, hard, smooth, covered with a fine membrane, not very vascular, the size of a large apple, the root thick. On the fore part, and all around the right side, the os uteri felt adhering to it. There was no difficulty in passing the finger between the root of the tumour and inner surface of the tumour, and all round the left side, but on the right and in front the os uteri adhered to the tumour; it could be felt passing into its substance, and a ligature could not be applied around the root of the tumour, without including a portion of the os and cervix uteri. It was recommended that the hæmorrhage should be checked by proper remedies, and that no operation should be attempted until the tumour had descended lower into the vagina. The tumour did descend considerably, but not sufficiently low to allow of a ligature being applied with safety. The hæmorrhage ceased, and the patient continued to enjoy tolerable health till 1848, when hæmorrhage occurred, and she died suddenly. I had not enjoyed an opportunity of examining the state of the tumour for a considerable period before her decease took place, and there was no post-mortem inspection.	Died; no operation attempted.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
26	June 27, 1847	Mrs. —. Dr. Grant, Mr. Hills, Richmond	45	Married	Dr. Grant, the same morning I first saw the patient, "found a large tumour filling up the os uteri, which was much dilated;" the fundus uteri I felt above the brim of the pelvis; the os uteri in a sound state; the neck obstructed by a solid elastic tumour, nearly as large as a cricket-ball, distending the cavity. The surface of the tumour was rough and irregular. This patient had suffered several years from a sense of bearing down, and pain during menstruation; and there had been a serous discharge tinged with blood, but little hæmorrhage. It was resolved to palliate the symptoms as far as possible till the tumour had descended, and the back part at least had passed through the os uteri. It was not considered justifiable to attempt to seize this tumour with sharp forceps, and drag it through the os uteri and vagina, and invert the uterus that the root might be brought into view and divided with the knife. After the lapse of many months, the greater part of the tumour, but not the whole, having passed through the os uteri, and the finger could be passed all round the root, which was thick and short and dense, I resolved to pass a ligature around it. On the 27th of June, 1846, I succeeded with difficulty in applying a strong ligature around the root, which was entirely within the os uteri. Every day the ligature was tightened twice with great force, and the tumour soon began to show signs of decomposition; but nine days passed away, and the division of the root by the ligature had not been effected. The discharge being very profuse and most offensive, I seized the putrid mass in the vagina with a pair of strong forceps, drew it forward, and cut its root across. No hæmorrhage followed. All the symptoms disappeared; but the patient, some months after, began to suffer from violent neuralgic attacks on the left side of the pelvis and left lower extremity, for which large doses of morphine were required. This led to the habitual use of narcotics, which soon deeply injured her health and shortened life.	
27	July 9, 1846	—— With Mr. Price,	Middle	Single	I applied a strong ligature around the root of a polypus of the uterus, which was hanging low in the vagina. The patient had repeatedly suffered from	Recovered.

		of Stamford Hill			attacks of uterine hæmorrhage. With a pair of forceps, Mr. Price drew the tumour as far as possible out at the vagina, and I divided the root with the scapula, leaving the ligature nearer the uterus. When cut into, the polypus presented the appearance of a tube lined with a smooth membrane. The ligature came away in a few days, and the patient recovered perfectly.	
28	April, 1846	A lady, with Dr. Duffin	—	Married	This patient had a fibrous polypus, the size of a large pear, with a thick root, encircled by the os uteri. A ligature was easily applied with the double canula, and the polypus came away in five days after, in a state of slight decomposition. On the 28th, there were symptoms of inflammation on the left side of the uterus, and tenderness along the crural vessels. The whole left lower extremity became swollen, as in cases of common crural phlebitis in the puerperal state; and the disease, after running the usual course in a mild form, terminated favorably.	Recovered.
29	March 27, 1848	A lady, under the care of Mr. Jones	—	Married	Mr. Jones requested me to see a lady from whom he had removed, some time before, a small polypus of the uterus. For a considerable period, the sanguineous and serous discharges and uncomfortable feelings about the uterus had disappeared. Having returned, I was requested to see the case with him. The finger readily detected a small soft polypus protruding between the lips of the os uteri. Through the speculum were seen a small, red, vascular tumour, like the common vascular tumour of the meatus urinarius, which was readily seized with the forceps and twisted off.	Recovered.
30	Oct. 2, 1848	Mrs. R—	40	Married; one child	Has had one premature labour and several miscarriages; the last took place five weeks ago, without any external cause. Since that time there has been more or less a sanguineous discharge from the uterus, without pain or sensation of bearing down; no enlargement of the abdomen. I found the uterus slightly enlarged, the orifice open, so as to admit the points of two fingers; the margin smooth, thin, soft. No tendency to cancerous disease. Immediately within the orifice a tumour was felt, the size of the smallest apple, hard, not perfectly equal, several knots projecting from it; the finger could be passed around this, within the os and cervix uteri, to which it did not adhere; the root could not be felt. This tumour was covered with a membrane. It was recommended to make no attempt to remove this tumour until it had passed through the os uteri, and then a ligature to be applied. I heard nothing further of this patient till February, 1850, when I was informed that the symptoms had gradually disappeared, that the health was restored, and that the tumour had receded within the uterus, and finally disappeared.	Recovered.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
31	Jan. 12, 1849	Miss B—	45	——	Has been afflicted with headache, indigestion, and leucorrhœa for many years, pain in the lower part of the abdomen, and sense of bearing down; catamenia regular, but painful. No suspicion was entertained by her medical attendant that any organic disease of the uterus existed. There was found, on examination, in the upper part of the vagina a soft polypus, with an unequal surface and narrow neck, surrounded by the os uteri. On the 24th of January, a ligature was readily passed around the root of the polypus, and it came away on the 26th.	Recovered.
32	—— 1850	Miss B—	46	——	About a year after the removal of the polypus in the last case, the symptoms returned, and another polypus was found in the upper part of the vagina, which was at once twisted off by the root with the forceps.	Recovered.
33	March 8, 1849	Mrs. W—	Middle	Married; sterile	Catamenia always regular, but she has suffered from leucorrhœa in the intervals, with a feeling of great fulness about the pelvis, pains in the sacrum, and a dead sensation of sinking about the chest. The nervous system a good deal deranged. There is a small polypus hanging through the os uteri into the vagina; this was readily laid hold of with the forceps and twisted off. The symptoms were relieved to a certain extent only, and the sterility has continued.	Recovered.
34	April 1, 1849	Mrs. M—	47	Married; several children	The late Dr. Moore requested me to see a lady in consultation with him. She had suffered long and severely from irregular discharges of blood from the uterus; but Dr. Moore had not been in attendance till a few days before, when he insisted on being allowed to ascertain the condition of the uterus, and discovered that there was a large polypus in the vagina. He applied, with some difficulty, a strong silk ligature around the root of the tumour, which was neither very thick nor short. On the 6th of April the ligature broke, and came away without the polypus, which was in a flaccid and putrid state. In the evening, the polypus was drawn through the orifice of the vagina with the fingers, and on being slightly twisted the root gave way. On the 7th of April, without any hæmorrhage or cause to account for the unfavorable change,	Died.

					difficulty of breathing and sudden sinking took place, and she died in a few hours.	
35	July 27, 1849	Mrs. L—. Mr. Loudon	35	Married; two children; widow	Has suffered some time from indigestion, palpitation of the heart, and general debility, without any obvious cause. The catamenia had been irregular for a considerable period, and twice a great discharge of blood had taken place from the uterus, with severe dragging pain about the sacrum. There was a red vascular polypus, the size of a common hazel-nut, seen hanging through the os uteri by a slender neck. The lips of the os uteri were not ulcerated. The information gained by the use of the speculum in this case was, that the polypus was red and vascular. How the polypus was got rid of is not stated in my journal.	Recovered.
36	Aug. 25, 1849	Mrs. C—	38	Married; five children, the youngest four years old	A year ago was quite well. Ever since there has been more or less red-coloured discharge, with violent pain in the right shoulder and in the right hip, and sense of weight in the region of the uterus; dyspnœa and palpitation of the heart. There is a polypus of moderate size, with a slender neck, hanging through the os uteri, in the most favorable state for the ligature. On the 28th the operation was performed with great ease; and on the 1st of September I received a letter from her medical attendant in the country, to say that the polypus, about the size of a large pigeon's egg, had come away, and that the patient was going on very well.	Recovered.
37	June 28, 1850	Mrs. C—. With Mr. Hare and Mr. Miskin	48	——	Has been indisposed for three years, and has had occasionally hæmorrhage from the uterus, pain, and bearing down. Was seen by Dr. —, who said there was thickening of the right side of the uterus, which he compared to an apple cut in two, and which he thought in time might require to be removed. During the last two years, another experienced physician has seen this patient occasionally, and he has made an unsuccessful attempt with the double canula to apply a ligature around the root of the large tumour in the vagina. This tumour now occupies the whole of the upper part of the vagina; the root is extremely thick, and, except on the right side, is surrounded by the os uteri. With the speculum, I saw a portion of the membrane covering the tumour near its apex, which had an ash-gray colour, and was in a sloughing state. There was a granulating ulcer at the margin of this slough. The membrane covering the remainder of the most depending part of the tumour was red and smooth.	Died.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
					On the 30th, I made an attempt to include within a strong ligature the root of this tumour, but did not succeed, in consequence of a part of the os and cervix uteri adhering closely to the root of the tumour—a circumstance which had escaped my observation before proceeding to the operation. On the 28th of July it was obvious the patient would soon sink, from the irritation and discharge, if the tumour could not be removed. With the bent rod I succeeded in passing a strong whipcord around the tumour, but experienced great difficulty in doing so in consequence of there being no peduncle on the right side. Great care was taken to avoid including any part of the os uteri. On the 29th the discharge had ceased, and the patient was in a satisfactory condition. During the succeeding nine or ten days, the ligature was twice every day forcibly tightened; the tumour became absolutely gangrenous, yet the ligature had not divided its roots. I laid hold of the putrid, sloughing mass with a pair of forceps, dragged it out of the vagina, and with a bistoury divided its root. No bleeding took place, and for a time it was hoped the patient would recover. But the weather being extremely sultry, diarrhœa took place, and she gradually sank.	
38	March 5, 1849	Mrs. Weymouth	About 36	Married; sterile	Constant discharge, with great sense of fulness and pain in the back and spine and about the sacrum, and a dead sensation of sinking about the chest. Emaciation; no swelling about the feet or ankles. Catamenia regular; constant leucorrhœa; nervous system much shaken. I examined, and found a small polypus hanging through the os uterus. The next day it was easily removed with the forceps; but the symptoms were only partially relieved, and she has continued sterile.	Recovered.
39	—— About 1849	Case in Westminster, with Mr. Randolph and Mr. Lavies	—	Single	With Mr. Randolph and Mr. Lavies, I saw a case in which the tumour in the vagina was as large as a child's head, and the os uteri could not be reached with the finger. I included, by means of the bent rod, in a strong ligature the greater part of this tumour, when in a black putrid state it was drawn out of the vagina and divided. A profuse and dangerous hæmorrhage	Recovered.

					immediately took place, the second ligature applied having slipt off, though immediately before strongly tightened. Sponge and lint were introduced into the vagina, and firmly kept in; and by this and the application of cold, and other means employed, the bleeding ceased. The patient recovered perfectly; but the following year it was found that the vagina was again filled with an enormous tumour. I did not again see the patient, and I believe no operation was attempted. The case proved fatal, and the uterus after death was sent to St. George's Hospital, for my examination. The tumour had formed an extensive adhesion with the vagina. The root of the mass was slender, and sprung from the os uteri, and might easily have been tied with a ligature; but the adhesion between the tumour and vagina must have rendered this impossible. Unfortunately, the notes of this case, and the preparation, have not been preserved; but the facts were exactly as here stated, though the last fact was omitted in the history previously given.	Died from disease of the brain.
40	1848, or 1849	Mrs. B—, Norwood	30	Married twice	I saw a case of large polypus of the uterus, with Mr. Sheel, of Norwood, and to him I am indebted for the following faithful report:—Mrs. B— was much blanched from having had frequent hæmorrhage from the uterus, with constant pain and dragging sensations in the loins and hips. She has been recently married a second time. Her first marriage was followed by the birth of two children, at intervals of two years; she was about thirty years of age. On examination, I found the vagina filled with a large fibrous tumour, the root of which I could not reach; but the edges of the os uteri were traceable round the mass as it protruded from that organ. Dr. Lee was requested to tie the polypus; and after considerable labour and perseverance, he was enabled to pass a strong ligature round the mass, as high up as it could be reached, and in the course of ten days a large putrid mass was brought away; the passage at the upper part was still filled with the remainder of the tumour, the ligature having detached only half the mass. After a time the remainder might perhaps have been successfully removed with the ligature; but the patient was attacked with shivering, followed by urgent and continued vomiting, great pain in the head on the left side, which continued for some days. Coma gradually supervened, and she gradually sank. The post-mortem examination proved the existence of a large mass still existing in the	

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
					vagina, extending into the uterus, and attached to the side by a broad root. I do not recollect exactly to what part of the organ it was attached. The brain contained fluid between the membranes and in the vessels. On the left hemisphere, at the anterior part, a large softened mass presented itself, like a deposit of yellow lymph, surrounded with matter, and the surrounding structure of the cerebellum much coagulated with blood.	
41	Aug. 16, 1850	—— Dr. Cross	—	Married	I passed a ligature around the root of a polypus of the uterus, of considerable size, in Westminster, with Dr. Cross. The shortness of the peduncle rendered the operation difficult, but it was completely successful.	Recovered.
42	Sept. 26, 1850	—— Mr. Cæsar Hawkins, St. George's Hospital	—	——	On this day I saw, through the speculum, a large polypus in the vagina in a state of ulceration. The granulations were distinct, and there was a quantity of pus flowing from the parts. The symptoms of polypus in this case had only been recently observed. The patient was under the care of Mr. Cæsar Hawkins, and I believe the polypus was successfully removed with the ligature.	Recovered.
43	Sept. 30, 1850	—— Mr. Cutler, St. George's Hospital	Middle	——	I was requested by Mr. Bailey to see a patient in St. James's Street, who had suffered during two years from menorrhagia and attacks of uterine hæmorrhage. She was reduced to a state of the greatest feebleness. I found a tumour in the vagina, the size of a small pear, the root of which, thick and firm, was continuous with the anterior lip of the os uteri. The os uteri did not encircle the peduncle; the anterior lip, in fact, formed the root of the tumour. I sent the patient into St. George's Hospital, where, after repeated examinations and consultations of the surgeons, it was determined by Mr. Cutler to enclose the peduncle of the polypus with a strong ligature, which was readily done by him. The root of the polypus was sooner divided with the ligature than we expected. The tumour came away in a sloughy, broken-up condition, and the patient soon left the hospital restored to perfect health, and has since continued quite well. The ligature was six days around the root. The constitution of this patient was so much impaired by the	Recovered.

					disease, that it appeared doubtful whether the operation was justifiable. In the following case the strength of the patient was so greatly reduced, that she died soon after the removal of the polypus.	
44	——	——	Middle	——	Last autumn I was requested to see a lady beyond the middle period of life, who had long been labouring under the most common symptoms of cancerous ulceration of the uterus, and was believed by her medical attendant to be dying of cancer. I found the os and cervix uteri nearly in a healthy condition, encircling the root of a polypus in a sloughing, disorganized state. I applied a ligature, without difficulty, around the root of the polypus, and it came away in the course of a few days. The patient, however, continued to get weaker, and died.	Died after the polypus had been removed.
45	July 2, 1839	Mrs. M—	49	Married; five children	Has had profuse discharges of blood from the vagina at intervals, which have greatly weakened her. She has suffered much from pain in the sacrum, sense of weight and bearing down about the anus, and frequent desire to pass the urine: at other times a yellow discharge from the vagina. Had come into St. George's Hospital the previous Wednesday, and was under the care of Mr. Cæsar Hawkins. There was a polypus in the vagina, the size of a large orange. Through the speculum, we saw its surface covered with a red membrane, like the mucous membrane of the mouth. There was an ulceration of this membrane to a considerable extent on the right side. The root of the tumour was short and thick, and was attached to the anterior part of the os uteri. 10th July.—The patient left the hospital, and returned to her home in Lambeth. With Dr. Blakeley Brown, I went and tied the polypus with the double canula, which was passed up along the anterior part of the tumour. The ligature was easily applied; no pain or fever followed, but a dark fœtid discharge. On the evening of the 12th, in tightening the ligature, it came away with the polypus. On cutting into the polypus, it was found to be a fibrous tumour, full of blood-vessels. In the centre of the tumour there was a cavity filled with coagulated blood; this was lined by a smooth membrane.	Recovered.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
46	1850 and 1851, and 1852	—— Mr. Cathrow, St. George's Hospital, Mr. Tatum	Beyond middle	Single	In 1850, Mr. Cathrow requested me to see a patient, who had a tumour of large size in the vagina. It had a smooth surface, and the density was uniform throughout. The anterior lip of the os uteri could with difficulty be felt; but the length and thickness of the root of the tumour could not be accurately ascertained. There was some suspicion that it was an inverted uterus; but after the most careful examination of the history of the patient, who was unmarried, we satisfied ourselves that it was a large polypus, and not an inverted uterus. As the symptoms were not urgent, it was resolved to observe the disease for some time longer, before attempting to remove it. On the 31st of July, 1851, I again saw the patient with Mr. Cathrow. The tumour had increased in size; but as there were no symptoms threatening life, it was determined still further to postpone the attempt to apply a ligature around the root or a portion of the tumour. In the spring of 1852, the tumour had increased, and the symptoms had become so urgent, that it was necessary to interfere. I sent her into St. George's Hospital. Mr. Tatum passed a strong ligature around a large portion of the tumour, which in time came away. After this, it was found that the upper part of the vagina was still filled up with a portion of the tumour, which could not be included within the ligature. Mr. Tatum applied a ligature around the root of this mass, which in no great time came away, and I afterwards saw the patient recovering in the most satisfactory manner. There was no disease of the os uteri left.	Recovered.
47	July 12, 1852	Mrs. C—. Mr. Henry C. Johnson	30	Married	On the 12th of July, 1852, Mrs. C— was delivered of a premature child. A year before, I was requested to see Mrs. C—, in consequence of there being an enormous vascular tumour, not only filling the vagina, but protruding through the orifice. Mr. Johnson saw her with me, and passed a strong double silk ligature with a needle through the root of the part which was external. The ligature was tied, and in a few days the sloughing mass was cut off, and seen to be full of large blood-vessels. About a month afterwards,	Recovered.

					the tumour in the vagina having again increased, with the bent rod I carried a ligature as high up as possible over it. When in a sloughing state, and before the ligature had divided the root, I dragged the mass out of the vagina and cut it away. To check the bleeding which took place from the divided root, I was obliged to apply a red-hot poker. Complete recovery followed. pregnancy took place, and a rapid delivery; and it does not now (1858) appear that any organic disease exists in the uterus. 22d of August, 1853, delivered of a full-grown healthy child, now alive. Had a second child, at the full period, in 1858.	
48	March 17, 1852, and 1855	Mrs. P—, Norwich	44	Married thirty years; sterile	Three years before, the discharge at the monthly periods was increased, and coagula were passed with pain. These symptoms had continued, and she had suffered much from pain about the head of the colon in fits; distressing sensation of bearing down. An unusual sense of resistance was felt in the right side of the hypogastrium, when the fingers were pressed deeply down into the brim of the pelvis in this situation. Os uteri directed backward in the pelvis; cervix short. A tumour of considerable size in the anterior part of the pelvis, adhering closely to the uterus, or in its walls. The symptoms underwent no change during the six weeks she remained under my care; and she suffered much from paroxysms of pain about the head of the colon. She returned home; and her medical attendant informed me afterwards, that he "had been treating Mrs. — by local mercurialization, viz., introducing once or twice a week a wedge of hard Ung. Hydr., into the vagina, and smearing it over the tumour;" she frequently also took conium pills and quinine. On the 25th December, 1855, I was informed by her medical attendant in the country, that, after I had seen her, the sufferings became much more severe; that the pain resembled those of labour, that the os uteri had dilated, and that the tumour had protruded sufficiently for a ligature to be applied; that the ligature had divided the root of the polypus in a week, and that a large fibrous tumour had been extracted from the vagina; and that the patient had regained her usual health and strength, and that the uterus had resumed its usual functions. Ever since the operation, the patient has enjoyed the most perfect health.	Recovered.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
49	Aug. 15, 1852	Mrs. —	Beyond the middle	Married	Mr. Dupasquier requested me to see a lady who had been suffering for a considerable period from menorrhagia and a distressing sensation of bearing down about the uterus. There was a polypus in the vagina, the size of a pear, with a slender root completely surrounded by the os uteri, the lips of which were in a healthy condition. Little difficulty was experienced in applying a ligature around the root of the polypus with a double canula; the next day the ligature was tightened, and the day after the polypus was in a flaccid, decomposed state, and it came away with the polypus the following day. The patient recovered perfectly.	Recovered.
50	Dec. 21, 1852	Mrs. —, Albany	60	Married	Dr. Scott requested me to see a lady who had been in good health nine months before. A coloured discharge from the vagina then took place, with pain in the back and region of the kidneys, extending down the back part of the thighs to the knees, with occasional irritation of the bladder. A polypus, the size of a large fig, was hanging by a slender neck through the os uteri, the lips of which were healthy. Some purgative medicine was recommended to be taken, light diet and quiet recommended, and in a few days we proposed applying a ligature around the root of the polypus with the double canula. I went with Dr. Scott to tie the polypus, but it was gone; no vestige of it remained, and no further treatment was required. This is not the only case in which I have seen a thorough examination with the finger cause the destruction of a small polypus of the uterus.	Recovered.
51	March 24, 1853	Mrs. R—	54	Married; children	It was stated that, about eight or nine years before, there had been a tumour of the uterus removed by ligature; and that this operation had been succeeded by incontinence of urine and some calculous disease. A few days before I saw her, she had consulted a practitioner, who informed her that there were two tumours in the uterus, and that the uterus pressed upon the bladder. He proposed to "restore the womb to its proper place, and keep	Recovered.

					it up." Before consenting to this, another practitioner was consulted, who requested that I should see the patient. Her general health was good. Ever since her first labour, there had been some difficulty in retaining the urine, and she had long suffered from leucorrhœa. The urine had been examined chemically and microscopically, and no disease discovered about the kidneys. I could discover no tumour or displacement about the uterus; but there was a small polypus, with a slender neck, hanging from the orifice, which was easily removed with the forceps.	
52	Aug. 25, 1853	Mrs. —. Mr. Young, of Sackville Street; Draper's Hotel	Middle	Married; several children	By means of a bent rod I applied a strong ligature around the root of a polypus, which was so large that it was impossible to reach the os uteri with the finger. Several unsuccessful attempts had previously been made to apply a ligature with the ordinary double canula. The ligature was tightened daily during eight days, when the polypus was in a state of complete decomposition, and emitting a most offensive odour. It obviously could not have been left longer in such a condition with safety, and there was no appearance of the ligature dividing the root. With a pair of lithotomy forceps the sloughing mass was forcibly dragged out, and its root divided with a scalpel. When the ligature came away, no hæmorrhage followed; and the recovery of the patient was so complete, that she left London in perfect health. In the country having exposed herself, some months after the removal of the polypus, to great fatigue and severe cold in an open carriage, fever came on, of which she died. I had seen this patient several years before the operation was performed, and had ascertained that there was a large fibrous tumour in the cavity of the uterus. The progress of the tumour through the os uteri was anxiously watched, as dangerous attacks of uterine hæmorrhage occurred at different periods.	Recovered.
53	Oct. 11, 1853	Mrs. M—	30	Married; several children	I saw a patient, far advanced in her fifth pregnancy, who had a small soft polypus growing from the os uteri. As it did not produce any unpleasant symptoms, and could not possibly interfere with the labour, it was considered most prudent to leave it alone till the labour was completed. Whether it disappeared spontaneously, or was removed artificially, I was not informed.	Recovered.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
54	July 7, 1854	Mrs. H—	39	Married; sterile	Pain in the left side, and left leg, and nape of the neck. Catamenia regular, without pain, till three months ago, when the discharge became constant and profuse; occasional difficulty in passing the urine. The uterus is low down, and turned backward; and there is a small, smooth, hard polypus hanging through the os uteri, which I recommended should be removed with the forceps. This was easily done on the 23d July, 1854.	Recovered.
55	July 11, 1854	Mrs. H—	40	Married; several children	Menorrhagia for twelve months. About a month ago, it was ascertained by Dr. — that there was a small polypus hanging from the os uteri. Nitrate of silver has been applied to the polypus seven times, and it is now much smaller. On examining, I found the os uteri open. The finger passed readily into the cervix where I felt the root of the polypus, which had been partially destroyed by the caustic; and another soft polypus, which was partially protruding through the os uteri, and hanging by a short, firm neck from the cervix. We looked through a glass speculum, and distinctly saw the end of this polypus, of a white colour, protruding between the lips of the os uteri. I laid hold of this with the polypus forceps, and twisted it off. Some force was required to do this, and the polypus was taken away completely broken up. Only a small part of this polypus could have been touched with the caustic. A good deal of hæmorrhage took place after the operation, but no unfavorable symptom.	Recovered.
56	Aug. 14, 1854	Mrs. W—, Bath	Under 35	Married; children	Profuse menstruation during a year, with escape of coagula. A few weeks since, it was ascertained that there was a polypus of no great size in the os uteri. The bulky part of the polypus had not completely cleared the os uteri. The root was so thick and firm, that it appeared unsafe to attempt to remove the polypus with the forceps until it had descended lower. This took place in a short time, and the polypus was safely removed with the ligature.	Recovered.

57	Oct. 6, 1854	A lady, Wrington, Somersetshire	42	Married	"Six months after marriage, miscarried, with flooding; suffered from hæmorrhage for about two years, with pain in the left ovary; frequently leeched. This combined drain broke down the general health, and blanched the skin. Brow ague has been constant for some months in every year, with other signs of debility. There has been no second pregnancy. Last Christmas, hooping cough and subacute pleuro-pneumonia. This was slowly recovered from, and in July there occurred profuse hæmorrhage from the lungs, attributed by Dr. — to want of fibrin. In August there was a slight but sudden gush of thin blood from the uterus, independent of menstrual discharge. Ten days ago a slight bloody purulent discharge was first seen, when the bowels acted; this has occurred daily with the alvine evacuation only, until within the last four days; though small in amount, it is permanent. Nothing is said of the condition of the uterus; of this Dr. Lee will be kind enough to form his opinion." There was a small polypus, with a slender neck, hanging through the os uteri; this and the cervix and body being in a perfectly healthy state. I seized the polypus with a pair of forceps, and twisted it off. The patient recovered very favorably.	Recovered.
58	——	——	—	Married; several children	Mr. George Babington, late surgeon to St. George's Hospital, requested me, about sixteen or seventeen years since, to go into one of the midland counties to see a lady who had polypus of the uterus. I went, and found a polypus, the size of a large pear, dilating the os uteri, from which it had not completely escaped. As there were no urgent symptoms, I thought it best to postpone the attempt to apply a ligature around the polypus until it had descended into the vagina. This had taken place some months, and I applied the ligature without, and the polypus came away in a few days, and the patient recovered in the most favorable manner; but, a considerable time after, an abscess formed behind the uterus, and burst into the vagina; from this the patient recovered perfectly.	Recovered.
59	Nov. 11, 1854	Mrs. E—	51	Married; several children	Had been three months under treatment with the speculum and caustic, on account of supposed ulceration of the os uteri, the posterior lip. The catamenia had ceased for a considerable period. Then hæmorrhage, of no great	Recovered.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
					extent, occurred three or four times, with uneasy feelings about the uterus. The posterior lip I found elongated, smooth, soft, and not ulcerated; os widely open. I felt within the cervix a small polypus hanging by a firm root from the posterior part of the inside of the cervix. I recommended that it should be immediately removed, and the treatment with the speculum and caustic discontinued. A doubt was expressed by the husband respecting the cancerous nature of the disease. I had no doubt that in this case there was no disposition to cancer. I removed the polypus with the forceps. On the 14th of May, 1855, I saw this patient at a great distance from London, in perfect health.	
60	July, 1855, and Jan. 3, 1855	Lady A—	50	Married; sterile	Catamenia have ceased several years. Has suffered from indigestion, and has been treated homœopathically. There has been pain in the back and in the left thigh, supposed to depend upon sciatica. A slight hæmorrhage has taken place from the uterus. There was a small polypus hanging through the os uteri, which I removed with the forceps. The root was remarkably firm; it required much force to twist and tear it away, but no mischief ensued, and the symptoms were relieved.	Recovered.
61	July 16, 1855	Mrs. C—	44	Married	During six years there had been irregular discharges of blood from the uterus, with uneasiness within the pelvis. The whole system was deranged, and there was a constant feeling of internal sinking. There was a polypus the size of a small pear, with a slender neck, hanging through the os uteri. I seized the polypus with the forceps; but the root was so firm that it would not break by any pulling or twisting force that could be safely exerted. The polypus, soft and vascular, was drawn down out of the vagina, and its root divided with a pair of scissors. In the evening it was found that a large quantity of blood had been lost. The plug was employed simply to restrain the hæmorrhage. The ligature ought to have been used in this case.	Recovered.

62	Oct. 26, 1855	—— Dr. B—	—	——	I received a letter from an eminent physician in the country, containing the history of a case which he considered to be one of inverted uterus. I was inclined, from the report, to believe that it was a case in which a large fibrous polypus had escaped from the vagina, and dragged the os uteri likewise externally. A ligature was applied, I believe, before the polypus was removed by excision. The patient recovered in the most favorable manner. The polypus was sent to me, and proved to be a common fibrous tumour.	Recovered.
63	March 24, 1856	—— With Mr. Dickinson, Fulham Road	—	Married	I was requested to see a lady residing in the Fulham Road, who had suffered some time from profuse menorrhagia. There was a polypus in the vagina the size of a large apple. The root, surrounded by the os uteri, was thick and short. I applied the ligature with the double canula, and the polypus came away four days after; and the patient recovered most favorably.	Recovered.
64	——	—— Oxford Street. Mr. Hicks	—	Married	I was requested by Mr. Hicks, of Henrietta street, to see a patient in Oxford Street, who had a polypus in the vagina, not very large, with a neck not very thick. I recommended Mr. Hicks to apply a ligature around it with the double canula. This was done. The polypus soon came away and the patient is now quite well.	Recovered.
65	June 17, 1856	Mrs. T—	—	Married; pregnant	Pregnant, and near the full period; slight hæmorrhage. Her medical attendant, Mr. Godson, before labour had commenced, felt something like the umbilical cord hanging out of the vagina. It was a long, smooth, flat polypus, hanging by a slender neck from the os uteri. As it was not likely to interfere with the progress of the labour, it was considered best not to remove it; and it disappeared spontaneously after the delivery.	Recovered.
66	May 19,	Mrs. W—	41	Married; sterile	Indigestion, debility, spasmodic cough, irritation of the scalp, painful state of left breast; catamenia very irregular; leucorrhœa, irritation of bladder. A small polypus hanging through the os uteri, which I tied with the double canula; and the ligature and polypus soon came away. The patient has continued low. The os uteri was afterwards found to be in a healthy state, and the body of the uterus not enlarged or indurated.	Recovered.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
67	July 10, 1856	Mrs. D—	49	Married; children	Repeated abortions, sense of bearing-down pains, hæmorrhage. During several years the uterus was known to be enlarged, and this was supposed to arise from a fibrous tumour imbedded in its walls. A polypus, of very considerable size, at last came through the os uteri; but the neck was short, and considerable difficulty was experienced in getting the ligature around it. The polypus did not come away for several days, and it was at last twisted away.	Recovered.
68	July 22, 1856	Mrs. P—	50	Married	A polypus, like a bean, hanging from the os uteri. Passed the forceps through the speculum and twisted it off. Some difficulty from the firmness of the root; the greater part of the polypus was at first torn off, and I was obliged to introduce the forceps again, and succeeded in getting it completely away. I believe the operation would have been more easily and successfully performed without the speculum.	Recovered.
69	——	Miss R—	50	Single	A red, smooth tumour hanging out of the vagina, the root entering the os uteri, not adhering to it. Tied with a ligature first, successfully. The following day the tumour appeared black. I drew down the tumour first, put a strong ligature around the root, and in doing this the root gave way, and the polypus with it. No hæmorrhage followed.	Recovered.
70	——	Mrs. O—	47	Married; sterile six years	Catamenia profuse during two years. A small, soft polypus hanging from the os uteri; removed with the forceps.	Recovered.
71	May 30, 1857	Mrs. B— Dr. Philson	40	Married; children	Constant hæmorrhage for a considerable period. A polypus, the size of a Seville orange; neck short and thick. Tied with difficulty by Dr. Philson, at Baldock. The polypus dropped off after seven days; recovery perfect. The tumour was very vascular (as you remarked after your examination), being transversed by numerous vessels, each as large as a crow-quill. Its base was an inch in diameter.	Recovered.

72	July 27, 1857	Mrs. P—	41	Married; children	Hæmorrhage from the uterus upwards of a year. No suspicion of the existence of polypus entertained, till the fact was ascertained by Dr. Gill a few days before I saw the patient. The polypus was very high up, and of large size; the os uteri could not be touched. It was recommended by a physician forcibly to drag this polypus, which was highly vascular, out of the vagina with forceps armed with sharp hooks, and cut its root across, without applying a ligature. With very considerable difficulty, I applied a strong ligature with a double canula. In about a week the ligature and polypus came away, and the patient recovered in the most favorable manner, and has since enjoyed good health.	Recovered.
73	Aug. 24, 1857	Mrs. T—	36	Married; sterile	It was stated that a polypus of the uterus had been removed from this patient in 1846. A polypus has recently appeared externally. There is a smooth, flat polypus in the vagina, with a slender peduncle; its attachment to the cervix cannot be felt; a ligature was easily passed around its root. In 1846 I had removed a polypus from this patient, similar in all respects to this polypus, but larger. Having seen mischief arise from twisting off a small polypus about this time in St. George's Hospital, I thought the ligature safer.	Recovered.
74	Oct. 29, 1857	Miss B—	39	Single	Catamenia profuse during three years. Had undergone a course of treatment with the speculum and caustic; and had been recommended to go into a cold country, where it was predicted she would get well. There is a polypus, about the size of a pear, in the upper part of the vagina, surrounded by the os uteri, and which is in a very favorable state for being removed. I tied the polypus with a strong ligature, and the polypus came away in a few days. No bad symptoms.	Recovered.
75	——	Mrs. D—	—	——	A small polypus hanging through the os uteri. Mr. Steele, of Reigate, applied a ligature around its root with perfect success.	Recovered.
76	April 4, 1858	Mrs. —. Sir B. Brodie	50	Married; sterile	In this case there had been occasionally slight hæmorrhages from the uterus. Sir B. Brodie had ascertained that there was a small polypus near the orifice of the vagina, the root of which was growing from the os uteri. I tied and removed this polypus with great ease, and the patient recovered without a bad symptom.	Recovered.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
77	Aug. 10, 1858	Mrs. —. Mr. Jordan's care	—	Married	Occasional attacks of profuse hæmorrhage from uterus. A polypus as large as a pear; tied with difficulty, and the ligature did not come away until the double canula had been turned several times firmly round. The patient recovered most favorably. See the preparation on the table.	Recovered.
78	Aug. 21, 1858	Miss G—	4	——		Recovered.
79	May, 1859	Miss G—	About 24	Single	A vascular tumour growing in the os uteri; it had only partially escaped; not connected with either lip; the vagina very contracted; it had not escaped completely from the os. Tied, with great difficulty, after repeated unsuccessful attempts; and twisted off with the ligature and double canula, when completely dead and sloughing.	Recovered.
80	Sept., 1860	Mrs. W—	—	Recently married	The same patient, having recently married, was attacked with hæmorrhage from the uterus. It was found that a red vascular tumour, of the same nature, had been formed, and had passed through the os uteri. It was tied; and on the fourth day, the ligature not having divided the root, it was removed, and tepid injections thrown into the vagina. The polypus came away soon after.	Recovered.
81	Feb. 15, 1855	Mrs. B—, Case at Islington, with Dr. Brown	—	Married	This was a polypus, about the size of a pear; the root neither thick nor short. Tied by Dr. Brown, without difficulty, and in a few days the canula and ligature came away; but the polypus had escaped, without being observed, two days after. The patient was restored to perfect health.	Recovered.
82	Nov. 21, 1858	Mrs. S—, Mr. Morgan	45	Married	The patient had undergone a long course of speculum and caustic for supposed ulceration. A small polypus with a thick root, which had not escaped through the os uteri. No unpleasant symptoms having occurred, it was recommended that no operation should be performed.	No operation performed.

83	March 8, 1859	Mrs. C—, Borough	25	Married; sterile	A small polypus, red like a cherry, hanging through the os uteri. Removed with forceps through the speculum; the root was dusky red. It was stated that Dr. Lever had removed a small polypus from the vagina of this patient some time before—about six months.	Recovered.
84	—— 1860	Mrs. F—	Middle	Married; children	A large tumour in the vagina, which I had strong reason to believe to be of a cancerous nature. With little hope of saving the patient, I passed a strong ligature, as high up as possible, around the mass. The ligature did not come away for a number of days; and the tumour being in a state of complete decomposition, it was cut away with a scalpel. A large mass afterwards remained in the vagina, which was drawn out with the forceps and twisted off. The patient recovered in the most favorable manner. I attended this patient with Dr. Crenny, and received great assistance from him in the management of the polypus.	Recovered.
85	Aug. 7, 1860	Mrs. C—	47	Married; sterile	A small, smooth polypus hanging through the os uteri, which I recommended should be removed with the forceps; but I have not heard that this has been done.	No operation performed.
86	Sept., 1858	Mrs. S—, at Hull	—	Married; children	A vascular bleeding tumour, of very considerable size, which had not completely escaped through the os uteri. I applied a ligature around it as high as possible, and it came away in a few days; and the patient recovered perfectly.	Recovered.
87	——	Case, St. George's Hospital	—	——	Some years since, a patient in St. George's Hospital, under the care of Mr. Prescott Hewett, had a very large polypus filling the vagina so completely that the os uteri could not be reached. I applied a strong ligature as high up as possible around the mass, and about a week after, when in a sloughing state, Mr. Hewett dragged it out of the vagina, and cut it off with a scalpel. The patient recovered in the most favorable manner.	Recovered.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
88	Oct. 17, 1857	Mrs. M—	About 41	Maried; three children	I was informed, in a letter from the Isle of Wight, that this patient had for about a year and a half had constant menorrhagia, deriving some benefit from the ergot of rye. The existence of some organic disease was strongly suspected, and I was requested to decide the matter. In 1850 she had been examined by Dr. L—, and he said there was retroversion of the uterus; and she underwent a long course of treatment, local and constitutional. Now looks extremely pallid, flaccid, and weak. She had been under the care of an eminent surgeon in London, and was so actually at the time. I examined and found a polypus, the size of a large apple, with a thick, short root, encircled by the os uteri. The eminent surgeon under whose care she was had applied a ligature on the 27th of November, 1857. I saw the patient a few days after going on favorably; but the ligature had not come away, and the polypus was in a very decomposed state. When the ligature and polypus came away I did not exactly learn, but I was informed that they had both escaped, and that there was for a time every prospect of the patient being restored to health. Fever probably arising from some deap-seated inflammation about the tissues of the uterus took place, of which she died. No examination was made after her decease.	Died.
89	Feb., 1860	—— Mr. Barnes, King's Road, Chelsea	—	Married	Mr. Barnes requested me to see a patient who had a polypus of the uterus of considerable size, and which had completely escaped into the vagina. As the patient had long suffered from hæmorrhage, and was in a most exhausted state, it was thought right that without delay a ligature should be applied around the root of the tumour. On the day when the operation was to have been performed, I was engaged with a case of placenta prævia; and the patient died before another day could be fixed for the purpose. The uterus and polypus have been presented to me by Mr. Barnes, and, with two drawings, are now placed on the table of the Society. (See Plates III and IV.)	Died; no operation performed.

90	Oct. 10, 1854	Jane S—, Burton Ward, St. George's Hospital	38	Unmarried	Leucorrhœa for years. Fourteen months ago had sanguinous discharge; and a small polypus was removed with forceps seven months afterwards; two operations performed. Root still remains. The root was removed as well as possible by forceps, and then touched with nitrate of silver; and nothing could be felt when she went out.	Recovered, November 14.
91	June 27, 1855	Hannah M—, ditto	26	Unmarried	Flooding first came on two years ago, and recurred for twelve months at short intervals. Six months ago, flooding again, which has recurred several times up to present date. Polypus tied, double canula.	Recovered on July 31.
92	Sept. 8, 1855	Mary M—, ditto	43	Married; no child	States that she has had nine miscarriages, and in 1842 a polypus removed. Two years ago, the menses became very profuse again, with clots and pain. Small polypus; portions torn away with forceps. Hardness all round the uterus, which is extremely rigid, also a soft sloughy swelling between rectum and vagina.	Hard root left behind. Discharged Oct. 15, much relieved.
93	July 18, 1856	Jane A—, ditto	33	Unmarried	Leucorrhœa for two years, and profuse menstruation, with pain in back. Large soft polypus removed by forceps in pieces, of a gelatinous character.	Recovered, August 7.
94	May 8 1857	Sarah M—, ditto	44	Married; no child	Catamenia always regular for six months; has had pain and bearing down in womb, and something became prolapsed in erect posture; pain and difficulty in micturition and defæcation; lost flesh lately, and complete retention of urine. Long, narrow, pendulous polypus uteri; uterus fixed in pelvis, feels hard and much enlarged. Polypus drawn down by forceps and cut off; no hæmorrhage followed, but some fever.	Discharged June 17, the pedicle still left.
95	July 15, 1857	Eliz. S—, ditto	34	Married; children	Flooding nine months ago, recurring every fourteen days; pain in back, and œdema of feet; great giddiness and dimness of vision. Polypus protruding through os uteri at first; after a day or two it retracted within uterus.	Went out to be operated on by Dr. Lee at her own home, July 21.

No.	Date.	Name.	Age.	Social Condition.	History of Symptoms and Treatment.	Result.
96	July 8, 1857	Emma M—, Burton Ward, St. George's Hospital	34	Single	Profuse menstruation, palpitation and giddiness, with severe floodings. Polypus first felt a month after admission; it receded next day, and came down again in a week, with pains like those of labour. This occurred more than once. She was discharged for change of air on 13th October, and re-admitted 4th of November, when the polypus was felt again, but receded several times after this, never coming low enough to admit of an operation for tying it.	No operation performed.
97	March 15, 1858	Ruth S—, ditto	51	Married; 4 children	General anasarca for two years; six months ago flooding came on, and has frequently recurred since, with pain. Large fibrous polypus tied a week after admission; ligature twisted off on the second day, and warm injections used.	Recovered April 14, without a bad symptom.
98	June 17, 1858	Mary B—, ditto	48	——	A large fibrous, pale, flabby tumour, tyed; it did not come away readily; it was twisted off. Crural phlebitis.	Recovered, September 1.
99	Nov. 3, 1858	Maria P—, ditto	49	Married; 5 children	Offensive discharge, streaked with blood tumor, for three month and tenderness over hypogastrium. Small vascular polypus, removed with forceps; the root was not quite absorbed on January 5th, 1859, when discharged.	Recovered Jan. 5, 1859.
100	Jan. 26, 1859	Catherine S—, ditto	47	Married; 1 child	Two years ago, had a flooding so severe that convulsions ensued; several floodings since; she is greatly debilitated and almost pulseless. Large fibrous polypus tied fourteen days after admission, and twisted off on fifth day.	Recovered without a bad symptom, Feb. 22.
101	Feb. 16, 1859	Ann K—, ditto	36	Married; 2 children	Three years ago had a miscarriage, and another twelve months ago; great flooding each time. Six months ago another flooding, and every week a dark-brown discharge, mixed with blood. Small vascular polypus removed with brceps.	Recovered March 23, 1859.

102	June 8, 1859	Matilda B—, ditto	47	Single	For four years had pain in back, and pinkish discharge with clots; and two floodings, one five days ago. A large fibrous polypus removed by ligature on 12th of July, and no bad symptoms followed.	Recovered Aug. 10, 1859.
103	Oct. 12, 1859	Mary K— St. George's Hospital.	29	Single	Catamenia profuse since May twelvemonth, lasting ten days, with great pain in back and hypogastrium; for the first six months she was continually unwell, with only two or three days' interval. A polypus was still felt inside the uterus, and an attempt to remove it with forceps was made, without success. On the 28th of January, however, the polypus had come down into vagina, and was tied with double canula, which was removed on the 31st; retention of urine for two days was the only bad symptom which followed.	Recovered on Feb. 22, nothing remaining of the polypus.
104	June 26, 1860	A. P—	35	——	Hæmorrhage from the uterus took place five or six years ago, and has returned occasionally. On the 21st, seized with a sensation of bearing down, and all of a sudden a large tumour made its exit from the vagina, which soon became painful and bled freely. The tumour protruded four inches, and it was doubtful whether it was the uterus inverted by the polypus or prolapsus. A ligature was applied around the root of what was considered polypus, and it was cut away; some hæmorrhage followed. After three days the prolapsed uterus was returned within the vagina, and the patient soon left the hospital quite well.	Recovered.
105	About 8 years since	Miss C—	Advanced	——	Had been suffering from hæmorrhage from the uterus to a great extent for a long period before I saw her, and ascertained that there was a polypus of the size of a small pea, with a slender neck. The ligature was easily applied with the double canula, and in a few days it came away with the polypus, and the uterine hæmorrhage ceased.	Recovered.

EXPLANATION OF THE PLATES.

PLATE III.

Fig. 1.—*a*. The fibrous tumour of the uterus, covered by the lining membrane, a part of which has been lacerated.

„ 2.—*a*. The lining membrane of the uterus, and a thin layer of the muscular coat of the uterus.

b. A fibrous tumour, forming the central part of the polypus.

PLATE IV

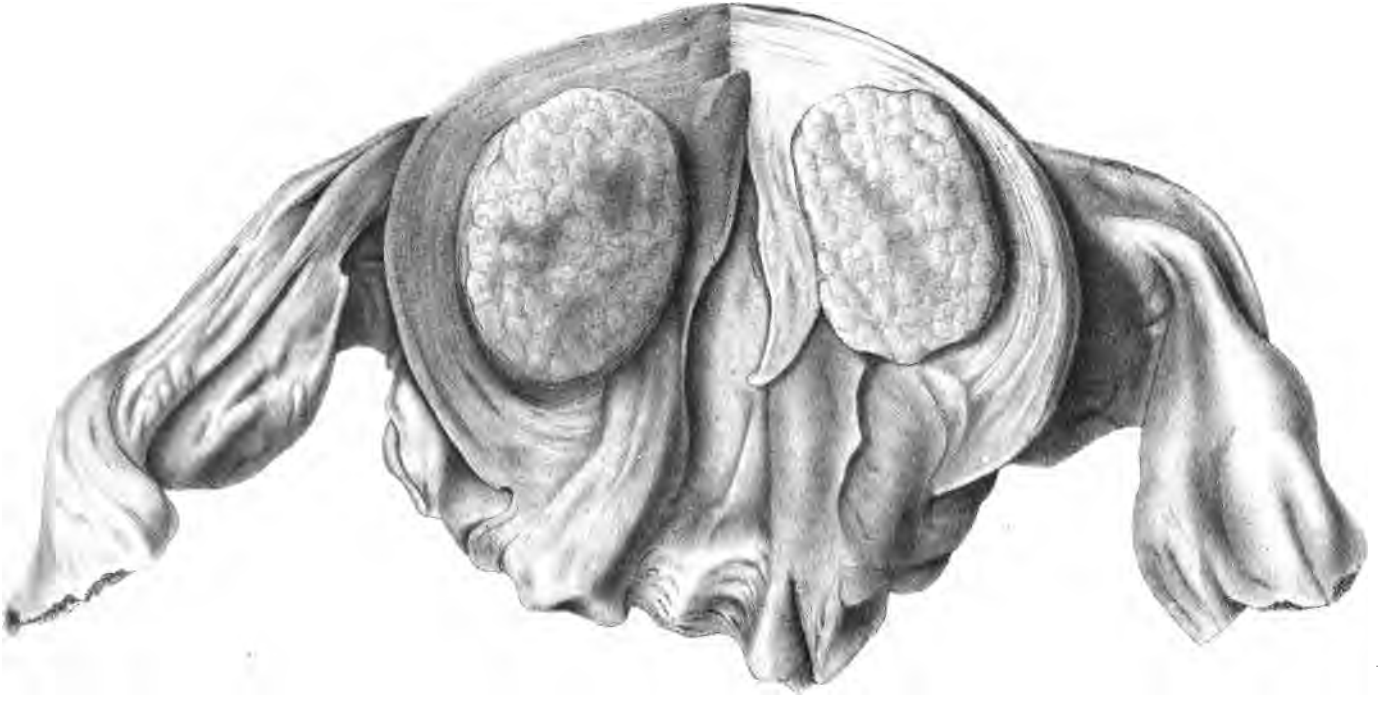
Represents a fibrous tumour of the uterus, having the same structure as that represented in Plate III.

Fig. 1.

Fig. 2.

A. Roberts del. G.H. Ford.

W. West imp.



A.Roberts.del. G.H.Ford. W.West imp.

OBSERVATIONS

ON THE

GROWTH OF THE LONG BONES,

AND OF

STUMPS.

BY

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The conflicting statements which have lately appeared with reference to the growth of the limb after excision of the knee, and comments upon my own remarks[1] relative to the same subject, have induced me to make some investigations upon the mode of growth of the long bones, and to examine carefully the cases that have come under my notice, in which the growth of the bones has been modified by accident or disease.

The solid structure of bone does not admit of the expansion requisite for interstitial growth; and it is generally admitted by physiologists that bones are increased in size, like shells, by the addition of osseous matter to the exterior or to certain parts of the interior, where a special provision for that purpose exists. Thus, in the long bones, an increase of thickness is caused by the continual growth and ossifica-

[1] 'Med.-Chir. Trans.,' vol. xli, p. 193.

tion of the blastematous substance beneath the periosteum, and an increase of length is caused by the growth and ossification of the layers of cartilage between the epiphyses and the shaft.

The few remarks which I have to make relate chiefly to the mode of increase of bones in length. This has been shown by the experiments of Hales, Duhamel, Hunter, Stanley, and Flourens, to be effected, almost or altogether, by addition at or near the ends of the bones; and my own observations are quite in accordance with theirs. The addition may take place beneath the articular cartilage, as in the condyle of the lower jaw, the acromial end of the clavicle, the proximal ends of the metacarpal bones of the fingers, and in most of the long bones of reptiles. Where, however, a considerable amount of growth is necessary, and where the end of the bone is required to be firm, an epiphysis is developed, and the elongation of the bone is effected almost entirely by the growth and ossification, on the side next to the shaft, of the layer of cartilage that remains between the epiphysis and the shaft.

The comparative softness of this layer, upon which its growing property mainly depends, renders it weaker and less resisting than the rest of the bone. It is, therefore, always very shallow and very uneven, and is situated near the end of the bone, where the larger area admits of the structure being less dense, and where, from the proximity to the joint, the bone is least liable to be broken. Had it been situated near the middle of either of the long bones, it is obvious that the bone would have been fit neither to bear weight nor to resist the contractile force of the muscles. Its proximity to the end of the bone is *maintained* by the ossification advancing into it almost exclusively on the side which is next to the shaft. In short, the thickness of this cartilaginous layer, and its position, are so regulated as to permit the necessary growth to take place without weakening the connection of the epiphysis with the shaft.

The cartilaginous layer is, moreover, soft and vascular in proportion to the rate of its growth. We find, accordingly, that the extension of the shaft takes place most quickly, and

is most prolonged, at the end where the bone can best bear the weakening consequent on the more rapid changes in the growing matrix; and that is, usually, the larger end. For instance, the lower end of the femur is larger, and is more favorably circumstanced for bearing weight and resisting muscular force, than the upper end; and the ossifying processes are much more active, and are longer continued, at the lower end than at the upper. In the tibia, the lower end is at a disadvantage in comparison with the upper, in consequence of its smaller size, the greater weight borne by it, and the violent shocks to which it is exposed, from its closer proximity to the ground; and there is less growth here than at the upper end.

In the upper limb the conditions are in many respects reversed; and growth is, consequently, most active at the upper part of the arm and at the lower part of the forearm.

The clavicles are slender; they carry the upper limbs slung upon them at right angles; and they have to resist all the forces which tend to approximate the shoulders to the median line. They are, therefore, ossified at an early period in nearly their whole length; and subsequent growth takes place in them more slowly than in any other of the long bones. The necessity for epiphyses, with soft layers of cartilage between them and the shaft, is thus avoided. For a short period, it is true, when the chest is undergoing its greatest lateral expansion, and when, consequently, a somewhat greater demand is made upon the growth of the clavicles, a shallow epiphysis appears at the sternal end of each; but it remains separate only for two or three years—from about seventeen to twenty. The sternal end of the clavicle, where this epiphysis appears, and where growth chiefly takes place, is larger than the other end, and a thick fibro-cartilage is interposed between it and the sternum.

In the cylindrical bones of the hand and foot, sufficient length is attained by means of one epiphysial layer of cartilage; and it may be noted, that in each of these, with the exception of some of the metatarsal bones, the epiphysis is at the larger end.

Most of the projecting processes of the skeleton serve for the attachment of tendons or ligaments; and, in order to give them sufficient firmness for this purpose, and at the same time to permit of their proper growth, osseous nuclei are developed in them. It should be borne in mind, therefore, that these apophysial nuclei, as well as the epiphysial centres, have relation rather to the requirements of growth, than to a homotypal plan; and we must be careful not to attach too much importance to them as guides to a homological arrangement.

A difficulty suggests itself with regard to this account of the mode of growth of the long bones. If the addition to their length be made only at the ends of the shafts, and if the amount added at one end of the shaft be greater than at the other, why does not an alteration take place in the relation of the several parts of the bone to one another, as well as in the relation of the surrounding soft parts to the bone?

My meaning will be understood by reference to the accompanying diagrams. In diagram 1, the opening of the canal

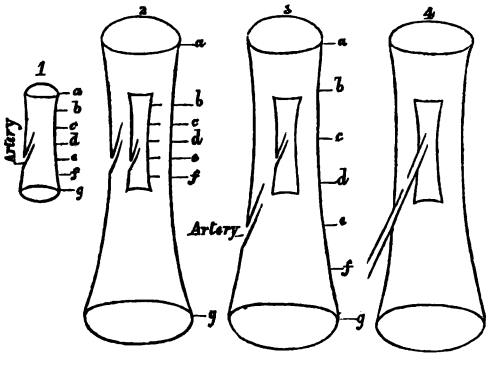

Diagram 1.—Diagram of young bone, with canal for medullary artery traversing the shaft. The transverse lines mark the divisions between the epiphyses and the shaft. The lines *a*, *b*, *c*, *d*, *e*, *f*, *g*, represent equidistant fibres connected with the epiphyses and shaft.

„ 2.—Diagram of the bone, enlarged, laid over the shaft of the young bone, showing the position which the canal for the medullary artery and the fibres connected with the wall and epiphyses would retain, unless there were some shifting of the periosteum along the surface of the bone.

„ 3.—Shows the position which the canal and the fibres really occupy in the enlarged bone; it is relatively the same as in the young bone, and is due to the interstitial growth of the periosteum and its shifting towards the end where the growth is quickest. The line of the canal in the grown bone is seen to be a continuation of that in the young bone.

for the medullary artery is represented as situated one third from the lower end of the bone. If the shaft of the femur be elongated at the ends, and chiefly at the lower end, the orifice of the canal would, in course of time, be found to have changed its relative position, and to be situated, not one third from the lower end, but at the middle of the bone; and a similar change would take place with reference to all the other points of the bone. Yet we know that this is not the case. The position of the various foramina and processes, in relation to the extremities of the several bones, is the same at all periods of life.

Again, in diagram 1, the lines *a, b, c, d, e, f, g,* represent fibres (muscular or any other) passing from different points along the length of a bone; *a,* from the upper epiphysis; *g,* from the lower epiphysis; *b, c, d, e, f,* from equidistant points along the shaft. According to the view given above, when the bone had acquired the size represented in diagram 2, the fibres *b, c, d, e, f,* would remain attached to points corresponding with the position they occupied in diagram 1; a wide interval would exist between *a* and *b,* corresponding with the amount of new bone added at the upper end of the shaft; and a still wider interval would exist between *f* and *g,* corresponding with the greater amount of new bone added at the lower end of the shaft. But we know that this is not the case. We know that the several fibres passing from the bone and all the surrounding soft parts, like the foramina and processes of the bone, retain the same relations to the ends of the bone at all ages.

It is clear that a growth of the periosteum merely over the ends of the shaft, corresponding to the growth of the bone, such as is usually described to take place, will do nothing to maintain the proper relations of the parts. There must be an interstitial growth in the whole length of the periosteum; and this must be attended with a continual shifting or sliding of the periosteum, and of the structures connected with it, along the surface of the bone at both ends, and more especially towards the end at which growth proceeds most quickly. For instance, the portion of the

periosteum, with the fibre *d*, situate at the middle of the shaft, must, in order to retain its position in the growing bone, be continually descending from the level of the position which it had with reference to the already formed bone. The periosteum, with its subjacent blastema, thus elongated by interstitial growth, and shifting upon the old bone, is enabled to cover the newly added bone at the ends of the shaft; and, of the successive layers of new bone formed beneath the periosteum, each is interstitially longer, as well as larger, than its predecessor, and so suffices to cover and thicken the latest additions which have been made at the ends of the shaft. This manner of shifting of the periosteum furnishes the following explanation of the fact, first noticed by Berard,[1] that the canal for the medullary artery always slants, as it passes outwards, towards that epiphysis which remains separate from the shaft to the latest period.

I have already stated, or intimated, that the end of the shaft at which the epiphysis is last united is the end at which growth takes place most quickly. This is shown to have been the case in the humerus, femur, and tibia of a pig, from which the accompanying drawings (Plate V, figs. 1, 2, 3) were taken. The animal had been fed with madder at intervals; but none had been given for a month before it was killed. It will be seen that the amount of bone added, since the discontinuance of the madder, at the upper end of the humerus, at the lower end of the femur, and at the upper end of the tibia—that is, at the end of the shaft in each bone where the epiphysis is last ossified—is twice as great as the amount added at the other end, or more. I have repeated the same experiment in several other instances, with the same result. This observation is also in accordance with what I have been able to glean from the accounts of experiments made by other observers, though I do not find that either of those observers mentions the fact. Indeed,

[1] 'Archives Gén. de Médecine,' vol. vii. Berard attributed the earlier union of one epiphysis to the better supply of blood furnished to it in consequence of the nutritious artery taking that direction.

their experiments were made with reference to other points, and this appears only incidentally. Thus, Hales[1] pierced the leg-bone (probably the tarso-metatarsal bone) of a half-grown chicken through the scaly covering in two places, half an inch apart. In this bone, as in the case of the tibia, the epiphysis at the upper end is the one last united to the shaft. Two months after, the bone had increased an inch by growth, chiefly at the upper end. The remains of the marks were still the same distance (half an inch) apart. Du Hamel[2] found the chief growth at the upper end, in the leg-bone of a pigeon and in the tibia of a dog. Stanley, experimenting upon the radius and ulna in dogs, found the growth chiefly at the lower ends; and the lower epiphyses of these bones are last united to the shaft. The specimens are preserved in the museum of St. Bartholomew's Hospital. The drawings of the tibiæ of rabbits experimented on by Flourens[3] also show that these bones increase in length chiefly at the upper end. It may, therefore, be regarded as established, that the end of a bone at which the epiphysis is last united to the shaft is that at which the growth takes place most quickly. And, in order to maintain the proper relative position of the soft parts, there must, as I have already shown, be a continual shifting, in this direction, of the periosteum covering the greater part of the surface of the shaft. In the case of the femur, for instance, the periosteum of the lower two thirds of the shaft must be shifting downwards during the whole period of growth. This exerts a traction upon the medullary artery, which causes it to slant downwards, in other words, to run obliquely upwards from the periosteum into the bone; and the canal which transmits it through the wall of the shaft in the medullary cavity takes, of course, the same direction. In the tibia, the growth being chiefly at the upper end, and the shifting of the periosteum and the traction of the medullary artery being in this direction, the canal for the

[1] 'Statical Essays,' vol. i, p. 340.

[2] 'Mém. de l'Acad. Royale des Sciences,' 1743, p. 138.

[3] 'Sur la Formation des Os,' p. 16.

artery slants downwards, that is, away from the epiphysis last ossified, as it enters the shaft. The same view holds good with regard to the humerus, radius, ulna, clavicle, and all the long bones. Hence it appears that the *obliquity* of the canal for the medullary artery is caused by the unequal rate of growth of the two ends of the bone, and that the *direction* of its obliquity is determined according to the end at which the growth proceeds most quickly, that end being invariably the one at which the epiphysis is last ossified to the shaft.

The proper relative *position* of the canal is maintained, simply, by the addition of new bone around its outer end, and by the absorption of bone at its inner end. At first I thought that a gradual shifting of the canal must be effected by absorption of bone along one side—the side on which the greatest growth of the shaft is taking place—and by bony deposition along the other side. The examination, however, of the bones of animals fed with madder does not corroborate that idea; and further consideration has convinced me that there is no necessity for such a process. The diagram (No. 3) proves that the direction of the canal in the young bone may be so regulated that no alteration is required throughout the periods of growth.

Of the nature and mode of action of the laws which regulate the growth of the body, and which determine the amount of growth that is to take place, and the periods in which it is to be effected, we know nothing whatever. We perceive, however, that they are very definite in their operation, and very exact in their results. The proportionate growth at the two ends of a bone is very regular and determinate; and the exactness of the correspondence of the growth of the two sides of the body, provided it be not interfered with by disease, is very remarkable. How rarely does one limb, or any part of a limb, differ in length from the limb of the opposite side! How exact, too, is the relation maintained between the growth of a bone and the growth of the surrounding parts; not only of the parts immediately connected with the bone, but of the parts at a distance, the blood-vessels, the nerves, and the skin; so

exact and so constant that I never heard of an example of failure in it!

In the case of the limbs, each has the amount and period of growth assigned to it, and these are not dependent upon what is taking place in the opposite limb. The one leg will attain its proper length, though the other have been removed or stunted in growth by disease or other causes; and opposite limbs maintain and attain the same length, because the amount and period of growth which is assigned to each of them is the same. But this is not quite so in the case of the different tissues of any part. It may be that in them also a definite amount and period of growth is assigned to each. Still, for the proper carrying out of the processes of growth, they are dependent upon one another. At any rate, we have abundant evidence that the elongation of the soft parts is dependent upon the elongation of the bones. If anything occurs to interrupt the latter, if the epiphysial line of growth be interfered with or destroyed, there is a corresponding interruption to the growth of all the other tissues in the limb; and if anything occurs to increase unduly the growth of a bone, there is a corresponding increase in the growth of the soft parts. Where there are two bones, as in the leg, if the growth of one be interrupted, that of the other is usually interrupted also, but not invariably. Cases illustrative of these points, and of the growth of limbs after excision of joints, I hope to lay before the Society on a future occasion.

Thus it would seem that the growth of the soft parts is regulated by, and dependent on, the growth of the bones; and that the height of a man is mainly determined by the changes that take place in the shallow strata of cartilage connecting the epiphyses and shafts of his several bones.

Possibly this influence of the bones is attributable to the tension which their elongation exerts upon the soft parts. The tension so caused, operating upon all the structures along the limb, may excite and regulate their growth, just as we observe that the slight stretching of the cellular tissue of the skin and some other tissues, consequent on a

tumour forming slowly beneath them, gives rise to an increase in their growth. We must not, however, overlook the evidences of a reciprocal influence of the soft parts, and particularly of the muscles, upon the growth of the bones. This is shown in the relation which the thickness and density of a bone almost invariably bear to the strength and activity of the surrounding muscles; and when the muscles of a limb are inactive in childhood, from paralysis or disease of a joint, the growth of the bones upon which these muscles act, or, it may be, of all the bones throughout the limb, is usually impaired.

I am not acquainted with any fact which shows that an excessive action of muscles is productive of an excessive growth in the bones; on the contrary, we know that the right upper limb is no longer than the left, although it is in so much more frequent use.

It is difficult to estimate the direct effect of a deficiency in the supply of blood or of nervous influence upon the growth of the bones, because, in either case, the deficiency is generally attended with an impairment of muscular action.

ON THE GROWTH OF STUMPS.

An argument against the explanation which I offered,[1] of the fact that the limb often does not grow after excision of the knee, has been based upon the growth of stumps; for it is conceived that in them there is no "arrest in the subsequent growth of the bones."[2] To this I was unable to reply, having no exact information on the subject, and being unable to obtain any from the records of surgery or from men of experience. The general impression I found

[1] 'Medico-Chirurg. Trans.,' vol. xli, p. 216. "It is most probable that, in the instances in which a want of proper growth has been observed in the limb after recovery from excision, the sections were made through the *shafts*, and the entire epiphyses, with the thin cartilaginous matrix lying between them and the shafts, were removed."

[2] Pemberton's "Contributions to Clinical Surgery," in 'British Medical Journal,' 1859, p. 961.

to be that a stump keeps pace in its growth with the rest of the body; but there was no proof forthcoming that it does so.

The following measurements of the stumps of persons who have undergone amputation in childhood, and the following results of experiments upon animals, show this impression to be erroneous. They show that the growth of a stump usually is arrested—that is to say, that it does not keep pace with the growth of the other parts of the body—and that it accords with what the preceding remarks on the mode of growth of the bones would lead us to anticipate, inasmuch as the arrest is *most* marked in those instances in which the growth of the bone takes place chiefly at the *lower* end.

The notes of each of the following cases are from my own case-book. Unfortunately, having had no object of this sort in view, I have not been in the habit of stating exactly the point at which the bone was divided in the operation.

1. John F—, æt. 8; amputation in the right thigh, February, 1851, by circular incision, on account of disease in the tibia, involving the upper epiphysis. In December, 1860, the left femur measured eighteen inches; the bone of the stump measured seven inches. Unless, therefore, the bone were divided near its upper third in the amputation, which is not very probable, it has not kept pace in its growth with the other femur.

2. Frederick F—, æt. 13; amputation at middle of left thigh, April, 1854, on account of injury. In August, 1860, the right femur was seventeen and a half inches, the bone of stump five inches; the latter, therefore, is now not one third, instead of being one half, of the length of the former. A circle of the sawn end of the bone came away before the stump healed; but, all allowance being made for this and other sources of error, it is quite clear that the stump has not grown in proportion to the opposite limb.

3. Anne F—, æt. 14; amputation, March, 1854, by flap incision, for protracted disease of left knee. August, 1860, the right femur was fifteen and a half inches, the bone of stump six and a half inches. Here, again, unless the amputation were performed near the upper third of the limb, which is not probable, the stump has not grown in proportion to the other limb.

4. Joseph M—, æt. 6; amputation, May, 1855, by circular incision, on account of diseased right knee and failing health. August, 1860, the left femur was fourteen and a half inches, the bone of stump seven and a half inches. Stump conical; the end of bone covered by cicatrix.

5. Charles L—, æt. 10; amputation by flap incision, July, 1857, at middle of left thigh, after excision of knee. August, 1860, the right femur measures fifteen inches, the stump seven.

6. Frederick W—, æt. 14; amputation, November, 1855, by circular incision, on account of disease of the lower epiphysis of left femur. August, 1860, right femur measured seventeen inches, the bone of stump seven. The stump conical; cicatrix covering the end of the bone.

7. Harriett F—, æt. 6; amputation of diseased right knee, August, 1855, by circular incision. March, 1861, bone of stump measured seven inches, the left femur fourteen and a half.

8. Cornelius T—, æt. 12; amputation of diseased knee, May, 1853, by flap incision. March, 1861, bone of stump measured six inches, the left femur seventeen inches.

9. James M—, æt. 15; amputation by circular incision, March, 1854, below middle of left forearm, in consequence of an accident. March, 1861, ulna of stump measures five and a half inches, right ulna ten and a half.

On February 10th, 1860, I experimented on four rabbits, three weeks old.

1. Amputation in the right hind limb; femur, which measured one inch and eight lines, divided one quarter from lower end. A needle passed through the bone half a line above the cut end, and another three lines higher up. Skin sewed up over the bone.

The animal did not thrive, but died February 19th. The wound had healed. The end of the bone was covered by a layer of soft, granulation-like structure, which filled up the crevices in its edge, and was connected with the medullary membrane and the periosteum. There was no suppuration.

2. Amputation in the right thigh, which measured two inches, a quarter of an inch from its lower end. A needle passed through the bone half a line above the cut edge. The stump healed quickly. The animal was killed June 20th. There was an abscess at the end of the stump, not connected with the bone. The end of the bone was involved in tough, fibrous tissue. The bone of the stump (fig. 4) measured two inches. Its upper part (the head, trochanters, &c.) is of the same size as that of the other femur (fig. 5). The shaft is preternaturally curved, and rather thick; towards the lower end it is slightly tuberculated. The medullary cavity is large, but closed at the lower end. The needle has disappeared.

The left femur measures three inches and three quarters. That is to say, it has gained one inch and three quarters since the operation, whereas the bone of the stump has gained only half an inch. The latter, therefore, has not, by any means, maintained its due proportion to the former; instead of being three fourths, it is little more than half the length of the other femur.

3. Amputation in the left leg, which measured two inches and a quarter from the lower end. Needle passed through the tibia half a line from the lower end, and a second needle two lines higher up. Stump healed quickly. The rabbit was killed June 20th. The bone of stump (fig. 6) measures two inches and a quarter. The lower end is

uneven, partly in consequence of slight bony deposit around it, and partly in consequence of slight absorption, which has exposed the upper of the two needles in its middle. The ends of the needle are covered by new bone. The lower needle has disappeared. The medullary cavity is large, but closed below by a thin wall of bone.

The right tibia (fig. 7) measures three inches and three quarters. It has, therefore, gained one inch and three quarters, whereas the bone of the stump has gained only three quarters of an inch; instead of being three fourths, it is now three fifths of the length of the other leg-bone.

4. Amputation in right leg, which measured two inches and a quarter, a quarter from lower end. A needle passed through the bone half a line above the cut end, and a second needle three lines higher up.

Stump healed quickly. Animal killed June 20th. Bone of stump (fig. 8) measures two inches and a half. Its lower end is rounded off and slightly thickened and tuberculated. The lower needle is quite at the extremity of the bone, being exposed in the greater part of its length, and nearly set free, by the absorption which has taken place. The upper needle, covered up by bony deposit, is situated at the same distance from the lower needle as when it was inserted. The end of the bone was involved in tough, fibrous tissue, such as usually forms the cicatrix of a stump.

The left tibia (fig. 9) measures four inches. It has, therefore, gained one inch and three quarters, whereas the stump has gained less than an inch, and its proportion to the left tibia is altered nearly as in the preceding instance, viz. from 3 : 4 to 3 : 5.

In each of these specimens the bone of the stump is as thick as the corresponding part of the opposite bone, showing that there has been no deficiency of growth in this respect. But in neither of them has there been any growth at the end of the stump. On the contrary, that part has undergone more or less absorption. All the elongation that has taken place has been at the upper end of the shaft, and it is quite in accordance with the observations above made,

with reference to the relative amount of growth at the two ends of the shaft in the several bones, that the elongation of stumps in the leg, where the more quickly growing epiphysial line is left, has a nearer proportion to that of the opposite limb than it has in the thigh, where the more quickly growing epiphysial line is removed in amputation. Nevertheless this elongation, even in the leg, has fallen short of the proper amount, as is shown by comparing the length of the interval between the tibia and fibula on the two sides.

On July 23d, 1860, I experimented on two pigs nine weeks old.

1. Amputation a little below the middle of the right thigh, which measured four inches and three quarters. The stump healed quickly. The animal killed February 2d, 1861. The bone of stump (fig. 10) measures two inches and eight tenths. The medullary canal is closed below by a layer of hard bone continuous with the wall of the shaft. The lower end is rounded off, except at the posterior part, where a process of bone, about three lines in length, projects downwards from it. It was involved in tough, fibrous tissue, and, thus covered, projected into a bursa-like cavity, lined by tough membrane, with fibrous processes hanging into it.

The left femur (fig. 11) measures six inches and a half. It has, therefore, gained two inches and a quarter, whereas the stump has gained only about half an inch; and the stump, instead of being rather more than half as long as the other thigh, is considerably less than that.

2. Amputation a little below the middle of the right leg, which measured four inches and a quarter. Stump healed quickly. The animal was killed February 2d, 1861. The stump of the tibia (fig. 12) measures two inches and seven tenths. Its lower end was covered with tough, fibrous tissue. The medullary canal is closed by a thin, transverse sheet of bone; and a ring-like process of bone projects from the surrounding wall, two lines below the level of this septum.

The left tibia (fig. 13) measures five inches and a half.

It therefore has gained one inch and a quarter, whereas the bone of the stump has gained only half an inch, and is now rather less, instead of being rather more, than half the length of the other tibia.

These experiments on the pig are confirmatory of the results obtained by the experiments on the rabbit, inasmuch as they show—*first*, that the bone of a stump does not grow in due proportion to the corresponding bone of the opposite limb; and, *secondly*, that the proportion is more nearly maintained in the case of the tibia than in the case of the femur.

They are in accordance also with the observations above given of the stumps of persons who had undergone amputation in childhood; and the general results of my investigations respecting the growth of stumps is quite in accordance with the remarks made in the former part of this paper respecting the growth of bones under ordinary circumstances, and is such as we might, *a priori*, have expected. The bone of a stump is deprived of the epiphysial line of cartilage, or the means of growth, at one end, and it is also partly deprived of that stimulus to growth which is supplied by the natural use of a part. It accordingly does not elongate in proportion to the corresponding bone of the opposite limb.

Yet, it is said, stumps do sometimes grow too much, so as to be troublesome, and even to require the removal of portions of bone some years after the amputation.

Cases of this sort, undoubtedly, occur now and then; but they are so exceptional that we ought not to found any argument upon them, respecting the growth of bones, or even of stumps, under ordinary circumstances. The very fact of the elongating bone becoming troublesome and requiring removal is an evidence that the processes of growth in the stump are not taking place in a regular and orderly manner. For, if they did, the surrounding soft tissues would increase in due proportion, and, by continuing to afford a sufficient covering to the bone, would prevent its being troublesome. In some of these cases the elongation of the bone must be regarded as altogether abnormal,

resulting from some irritation at the end of the stump, and as being due to the same process as that which leads to the formation of exostoses and of those spicules of bone often seen around the end of a stump where there has been pressure against an artificial limb. The projections seen at the end of the pigs' stumps (figs. 10 and 12) appear to be of the same kind.

In other cases, the projection of the bone appears to be due either to a retraction of the soft parts or to the growth in the soft parts not being proportionate to that which takes place in the bone. I have already hinted that the elongation of the soft parts in a limb, under ordinary circumstances, may be due to the traction exerted upon them by the growing bone, that traction being diffused among them by the mode in which they are disposed about the bone. Thus, the lengthening of the humerus distances the radius, ulna, and other components of the forearm from the shoulder, and so exercises a traction upon the various muscles, vessels, nerves, and other soft parts of the arm. But in a stump the narrow end of the growing bone is pressed against the cicatrix. This may be firm enough to resist the pressure, and to communicate the force to the soft structures descending to and connected with it, and may so exert sufficient traction upon them to cause their growth, and to maintain the form of the stump more or less perfect; or it may yield under the pressure, rendering the stump conical, and even allowing the bone to make its way through. This result is most likely to occur in stumps of the arm and the leg, because, in them, the epiphysial line that remains is the one upon which the growth of the bone chiefly depends, and the cicatrix is, therefore, subjected to greater pressure from the end of the bone than it is in a stump of the thigh or the forearm. It is also most likely to occur after the circular amputation, because this provides a less thick covering to the end of the bone than does either the flap incision or Teale's method.

Agreeing with most preceding observers, that the elongation of a long bone is chiefly caused by growth at the

epiphysial lines, I have endeavoured in this paper to show that the elongation proceeds most quickly, as well as is continued longest, at the end where the epiphysis is last united, which is usually the larger end; this is attended with a shifting of the periosteum towards that end, and so regulates the direction of the canals for the nutritious arteries.

Secondly, that the growth of a stump is not usually proportionate to the rest of the body, and is least so when the more quickly growing end of the bone has been removed.

DESCRIPTION OF PLATE V.

Fig. 1.—Vertical section of the femur of a pig which had been fed with madder at intervals. The madder had been discontinued for a month before the animal was killed. The growth is seen to have been greatest at the lower end of the shaft.

„ 2.—Vertical section of the tibia of same pig, showing the growth greatest at the upper end of the shaft.

„ 3.—Vertical section of the humerus of same pig, showing the growth greatest at the upper end of the shaft.

„ 4.—Stump of femur from a rabbit.

„ 5.—Opposite femur of same rabbit.

„ 6.—Stump of tibia from a rabbit. The position of the needle indicated by transverse line.

„ 7.—Opposite tibia of same rabbit.

„ 8.—Stump of tibia from a rabbit. The position of the needles indicated by the lines.

„ 9.—Opposite tibia from same rabbit.

„ 10.—Stump of femur from a pig.

„ 11.—Opposite femur of same pig.

„ 12.—Stump of tibia from a pig.

„ 13.—Opposite tibia of same pig.

Fig. 1.

Fig. 2.

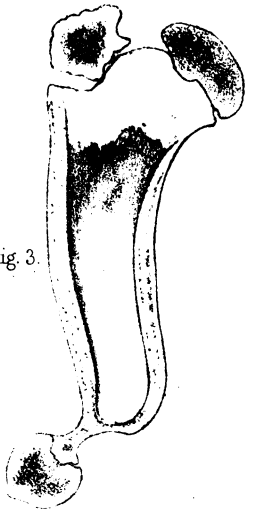

Fig. 3.

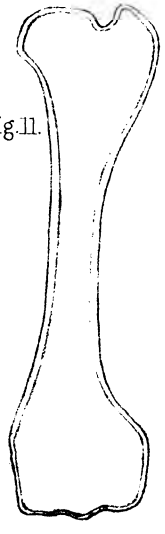

Fig. 11.

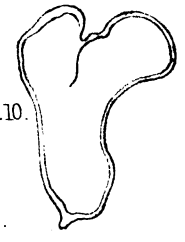

Fig. 10.

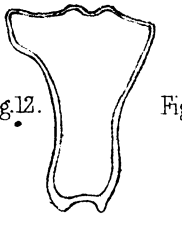

Fig. 12.

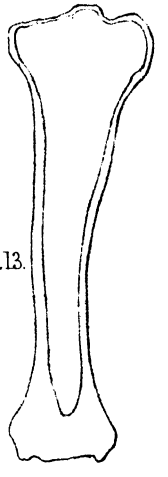

Fig. 13.

Fig. 4.

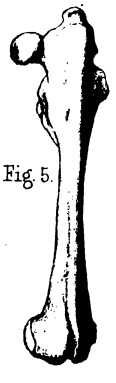

Fig. 5.

Fig. 6.

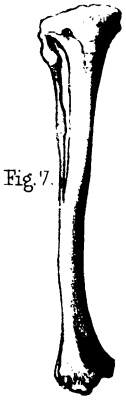

Fig. 7.

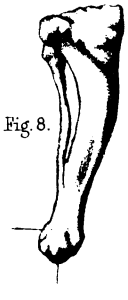

Fig. 8.

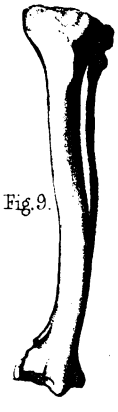

Fig. 9.

G.H.Ford.

W.West imp.

RESEARCHES ON ASPHYXIA;

WITH

OBSERVATIONS ON THE EFFECTS PRODUCED BY THE HOT BATH IN ASPHYXIATED ANIMALS,

AND ITS

USE IN THE TREATMENT OF SUSPENDED ANIMATION.

BY

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COMMUNICATED BY

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ALTHOUGH numerous investigations have been made with reference to the nature of asphyxia and the influence of various modes of treatment in restoring suspended animation, I am not aware that any previous observers have directed their attention to one of the points which it was the object of the experiments referred to below, more particularly to inquire into.

Of the intimate pathological changes which take place in asphyxia, our knowledge is still imperfect, and we are not yet agreed as to the best modes of treatment in the more acute forms of the affection. The various societies, which direct their efforts to the saving of human life, issue rules for restoring suspended animation, of the most opposite character; for whilst some recommend the use of the warm bath, others expressly forbid it, as not only worthless, but dangerous.

Physiologists concur as to the order in which the arrest of the vital actions takes place when the entrance of air to the

lungs is cut off. They agree that the function of respiration is stopped, and that animal life (so called) becomes extinct, before the cessation of the heart's action. With regard, however, to the period during which the latter organ continues to contract after asphyxia has commenced, opinions do not so fully accord.

The success which, in many instances, has attended the efforts to restore animation, where the function of the lungs had only just ceased, encourages us to hope that, in all cases in which the action of the heart is still going on, we may, by an improved method of performing artificial respiration, restore life; and the want of success (except in rare instances), in those cases where respiration had ceased for some time, and where, probably, the heart was no longer beating, should act as a warning to us not to lose a single instant in endeavouring to promote the respiratory changes, to which alone we must look for a favorable issue to our efforts.

It is a matter of great importance, in connexion with the treatment of asphyxia, to ascertain the period after the cessation of the respiratory changes during which attempts to reanimate are likely to be successful; and this must depend on the time the heart continues to beat. Further, it is also important, considering the differences of opinion which now exist on the subject, to estimate aright the value of the hot bath as a remedial agent in the affection, and to do this it becomes essential to ascertain its effects on an animal when in an asphyxiated condition.

With the view of throwing some light on the points above alluded to, I instituted a series of experiments, the definite object of which was to answer, as far as possible, the following questions:

1. How long does the heart continue to beat in asphyxia?

2. What are the effects of the hot bath on asphyxiated animals? First, after all respiratory movements have ceased, and are not re-excited; secondly, when respiration has been re-excited and is being feebly carried on?

My experiments were made on animals asphyxiated by submersion; but as the morbid changes which take place

in asphyxia are the same by whatever means it may be produced, I think it may be fairly assumed that the remarks I shall have to make and the inferences I shall draw, as far as they may be correct, will be generally applicable to all acute forms of the affection.

With regard to the first of the above questions, it is obviously very difficult to come to anything like a correct conclusion. As far as man is concerned, it is indeed impossible to do so, and even with reference to the lower animals it is very difficult; a large number of experiments becomes necessary in order to obtain an approximation to the truth. The principle generally admitted is that "in asphyxia the movements of the heart cease in a few minutes after the cessation of the functions of animal life;" but the occurrence of certain facts, such as the recovery of individuals who have been under water for several minutes, would lead us to doubt the truth of the assertion. The second question seems more readily answerable, but yet no direct experiments bearing on it appear to have been performed previous to my own, some of which were made four years ago.

The experiments given in the tables below were performed on warm-blooded animals—dogs, cats, and rabbits. Those referred to in table No. 1 were conducted in the following manner:—The animals were plunged into water which varied in temperature from 40° to 50° Fahr., being a few degrees below that of the surrounding atmosphere, in one instance the temperature being reduced to 36° artificially; they were kept completely under water from the time of their immersion, and when removed (after every external symptom of life had disappeared), were, either at once or after the lapse of a stated time, opened by the removal of a portion of the anterior walls of the thorax; the movements of the heart were thus observed without the pericardium being disturbed. Some of the experiments, viz., 9 and 10, 11 and 12, 14 and 15, and 17 and 18, were parallel experiments, i. e. the two animals of each experiment were of the same age and size, were submitted to exactly the same process of drowning, and were opened at, as near as possible, the same time, the difference between the two being that one was put into the

hot bath for the period mentioned, the other was left on the table exposed to the atmosphere during the same time. The Experiments 20 and 21, and 22 and 23, were also parallel experiments; solely directed, however, to show the pathological effects of the hot bath. The Experiments 25 and 26 and 27 and 28 were also parallel experiments, bearing on both the questions we are considering.

TABLE I.

No.	Animal.	Time kept under water.	Put into hot bath at 100°, and how long.	Period after submersion at which thorax was opened.	Period after submersion up to which the ventricular portion of the heart continued to contract.
1	A rabbit	4 minutes	No	5th minute	11th minute, removed whilst contracting.
2	,,	6 ,,	No	7th ,,	25th minute.
3	,,	12 ,,	No	13th ,,	35th ,,
4	,,	20 ,,	No	21st ,,	26th ,,
5	,,	31 ,,	No	32nd ,,	Had ceased to beat when opened.
6	A large dog	14 ,,	No	17th ,,	Ditto.
7	A rabbit	11 ,,	No	12th ,,	16th minute.
8	A dog	8 ,,	No	9th ,,	34th ,,
9	A rabbit	5 ,,	Yes; 5 minutes	11th ,,	20th ,,
10	,,	5 ,,	No	12th ,,	Had ceased to beat.
11	,,	6 ,,	Yes; 4 minutes	11th ,,	30th minute.
12	,,	6 ,,	No	13th ,,	30th ,,
13	,,	8 ,,	Yes; 5 minutes	14th ,,	Had ceased to beat.
14	,,	10 ,,	Yes; 5 minutes	60th ,,	Ditto.
15	,,	10 ,,	No	60th ,,	Ditto.
16	A dog	8 ,,	Yes; 5 minutes	15th ,,	Ditto.
17	A rabbit	6½ ,,	Yes; 5 minutes	12th ,,	18th minute.
18	,,	6½ ,,	No	13th ,,	Had ceased to beat.
19	A dog	8 ,,	No	9th ,,	Ditto.
20	A rabbit	4 ,,	Yes; 4 minutes	9th ,,	Heart contracting irregularly when opened.
21	,,	4 ,,	No	10th ,,	Heart contracting regularly, 23 to the minute.
22	,,	4 ,,	Yes; 4 minutes	9th ,,	Ditto feebly.
23	,,	4 ,,	No	5th ,,	Ditto vigorously, 64 to the minute.
24	,,	2½ ,,	Yes; 3 minutes	6th ,,	No regular action, ceased at 10th min.
25	A cat	4 ,,	Yes; 4 minutes	13th ,,	Had ceased to beat.
26	,,	4 ,,	No	13th ,,	Heart beating regularly, continued up to 15th minute.
27	A rabbit	1½ ,,	Dipped in	10th ,,	Heart contracted up to 45th minute.
28	,,	1½ ,,	Yes; 2½ minutes	8th ,,	Ditto 25th minute.

In analysing the preceding experiments with reference to the first subject of inquiry, viz., the duration of the heart's action, two must be set aside, inasmuch as in them the thorax was not opened till after the lapse of an hour from the period of submersion; these are Nos. 14 and 15. Out of the twenty-six remaining cases, in eighteen the heart was found beating when first observed, in eight its action had ceased.

In taking *an average* of the period during which the heart continued to contract in these cases, Nos. 1, 20, 21, 22, and 23 must be omitted, for in them the organ was either removed whilst in action or the time at which it ceased to beat was not accurately noted; the remaining thirteen give an average of twenty-five minutes *during which the ventricular portion of the heart continued to contract.* If we allow an average of nine minutes to the eight cases in which, on examination, the heart was found not contracting, and, including No. 1, at eleven minutes, take a general average of the twenty-two, we find it, as near as possible, *nineteen minutes.* These results do not coincide with those of Mr. Erichsen, who experimented on dogs by producing asphyxia in the open air; he gives an average of nine minutes and a half.

Setting aside the question of general average, it will be thus seen that in eighteen animals out of twenty-eight the heart was found contracting with more or less vigour and regularity when examined at the following intervals after the commencement of asphyxia, viz., the 5th, 7th, 13th, 21st, 12th, 9th, 11th, 11th, 13th, 12th, 9th, 10th, 9th, 9th, 6th, 13th, 10th, 8th minute, and that it continued in action during periods varying from the 11th up to the 45th minute from submersion.

In considering the second question we have to examine it in two different ways. We have, first, to ascertain what are the pathological effects produced by the hot bath in an animal, in which asphyxia has been so long continued that, on the cause of the asphyxia being removed, no efforts at respiration are made. To do this we proceed to compare

the morbid appearances presented by the various animals referred to in table No. 1, in order to see whether any differences exist between those which were submitted to the action of the hot bath and those which were not so treated.

The chief morbid appearances observed in the animals which were not put into the bath were as follows.

The lungs were but little altered from their normal colour; their substance was less crepitant than natural, and their large, emergent vessels, as seen at their roots, were somewhat distended, but to no great extent. The right cavities of the heart and the pulmonary artery were much distended; the left cavities contained a small quantity of blood; the blood was black and fluid throughout the body, but coagulated when removed from the vessels; the arteries contained a small quantity of blood. On opening a pulmonary vein or one of the large systemic veins, a considerable flow of blood always took place. It was observed during the examination of the animals that, whilst the heart was beating, and even after it had ceased to beat, on dividing a pulmonary vein, blood flowed, and continued to flow for a long time, and that the distension of the cavities of the right side of the heart and of the pulmonary artery became much diminished, the blood flowing freely through the vessels of the lungs.

The general morbid appearances presented by the animals which were put into the hot bath were these. The lungs were much more discoloured than when the bath was not used; their large vessels were more distended; their substance was firmer and heavier. The cavities of the heart were loaded with blood, both those on the left side as well as those on the right. In some instances the blood was coagulated in the vessels of the lungs, in the systemic veins, and in the cavities of the heart, and in all there was more or less of this condition observed. When a vein was opened the flow of blood was sometimes arrested by the presence of coagula, and was rarely free. The blood, when removed from the vessels, coagulated more rapidly and

formed a firmer clot than in the animals not put into the bath. In the animal which was put into the hot bath after being drowned for three and a quarter minutes in water at thirty-six degrees, the morbid appearances were the same as in the other animals, except that there was even more congestion of the lungs. (This experiment is not referred to in the tables.) That there was actually, and not only apparently, increased congestion of the lungs, and an increased quantity of blood in them, is proved by the results of experiments Nos. 22 and 23 and 25 and 26, in which the weight of the lungs in both animals of each experiment was taken. The lungs of No. 23, the larger rabbit and the one not put into the hot bath, weighed *considerably less* than those of No. 22, the smaller rabbit and the one which was put into the hot bath; and, again, the lungs of No. 26, the larger cat, not put into the hot bath, weighed *less* than those of No. 25, the smaller cat, which was put into the hot bath.

The following are the respective weights of the lungs of the four animals:

	Ozs.	drs.	grs.
No. 22.—The smaller rabbit (put into hot bath) .	0	4	49
„ 23.—The larger „ (not ditto) .	0	3	2
„ 25.—The smaller cat (put into hot bath) . .	2	6	36
„ 26.—The larger „ (not ditto) . .	2	5	37

The following notes are made with reference to the effects of the hot bath on the animals referred to in table No. 1.

In no single instance did the hot bath produce a respiratory effort, or any movement whatever, on the part of the animal. This was not only noticed in animals which had been drowned four, five, or six minutes, but in others which were under water only a minute or a minute and a quarter, and which, on being taken out, did not at once begin to breathe; in no instance of this kind did the bath produce any satisfactory result. The contractions of the heart seemed, generally speaking, to be less vigorous and to last

for a shorter time in those animals which were put into the hot bath than in the others.

In order to ascertain the second point referred to, viz., the effects produced by the hot bath in asphyxiated animals in which respiration has been re-excited, but is being only imperfectly carried on, a series of experiments was performed which are referred to in the table No. 2.

These experiments were designed, as far as possible, to imitate, in the animals experimented on, the condition of an individual, who, after having been drowned, is recovered from the water, and on being exposed to the air, first of all gasps and then begins feebly to respire; they were also designed to test the value of the hot bath as a remedial agent in such cases.

The animals which were the subjects of these experiments were all rabbits, with the exception of one, which was a cat. The rabbits were all of nearly the same age and size. All the animals were drowned in water at the ordinary temperature, which varied from 45° to 50° Fahr.; they were kept under water some for *one minute*, some for *one minute and a quarter*, and one, the cat, for *two minutes*. When removed from the water they were placed on a table exposed to the air, they were laid on their side, their mouth was opened, the tongue drawn forwards, and they were blown upon a few times by the mouth. In all the cases referred to the animals began to gasp almost immediately they were laid on the table, and respiration soon became feebly re-established. In order to compare the effects produced by the hot bath with those where all treatment was omitted, except that of exposing the body to the open air, some of the animals were left to themselves, whilst others, as soon as respiration was feebly re-established, were put into the hot bath.

Altogether, thirteen experiments bearing on this part of the subject were performed, twelve being on rabbits and one on a cat.

Of the thirteen, seven were treated by the hot bath, in which they were kept for periods varying from three and

a half to fifteen minutes. Of these, six died and one recovered.

TABLE II.

No.	Animal.	Time kept under water.	Put into hot bath at 100°, and how long.	Result.
29	A rabbit	1 minute	No	Recovered.
30	„	1 „	Yes; 3½ minutes	Died 5½ hours after submersion.
31	„	1 „	Yes; 15 minutes	Died 4 hours after submersion.
32	„	1 „	No	Died within 20 hours after submersion.
33	„	1 „	No	Died within 20 hours after submersion.
34	„	1 „	Yes; 7½ minutes	Recovered.
35	„	1 „	Yes; 12 minutes	Died 2 hours after submersion.
36	„	1 „	No	Recovered.
37	„	1 „	Yes; 10 minutes	Died 2 hours after submersion.
38	„	1¼ „	Yes; 5 minutes	Died within 20 hours after submersion.
39	„	1¼ „	No	Recovered.
40	„	1¼ „	Yes; 10 minutes	Died within 20 hours after submersion.
41	A cat	2 „	No	Recovered.

Six animals, after being removed from the water, were simply left to themselves, exposed to the atmosphere. Of these, four recovered and two died.

The following are the morbid appearances presented by the animals which died after having been put into the hot bath:

The lungs were generally small, as if collapsed; they were dark in colour, full of blood, quite firm, and almost liver-like in appearance; they resembled somewhat fœtal lung-tissue, or the collapsed lung-substance met with in adults. In some cases the condensed portions of the lungs sank in water. The trachea and bronchial tubes were free from frothy fluid; blood was found in all the cavities of the heart, the two ventricles being generally about equally distended; the blood was never very fluid, and in one

instance it was found coagulated in the cavities of the heart.

The post-mortem appearances of the two animals which were not put into the hot bath, but which died from the after-effects of the drowning, were as follows:—The lungs were somewhat congested, firm, and collapsed, but by no means to so great an extent as in the animals put into the bath. The blood was fluid, but less so than in acute asphyxia.

Without referring in detail to all the experiments, it appears to me that some of them show in a marked manner the different results of the two kinds of treatment resorted to; I am induced to quote the following:

In Experiments 36, 39, and 40, the same animal, a young rabbit, was used. On the first occasion it was drowned for *one minute* and then left to itself on the table. It recovered well. Three days were allowed to elapse, during which the animal was quite lively, took food, and appeared in no respects to have suffered from the effects of the experiment. It was again drowned, this time for *one minute and a quarter*, and when removed from the water was again left to itself. It soon recovered, and next day was apparently quite well. Three days were allowed to elapse again, during which time the animal was quite lively and ate as usual; in fact, no difference whatever was observable in its state as compared with that it was in before the first experiment. The animal was drowned for the third time, and for *one minute and a quarter*, as on the second occasion. When removed from the water it soon began to breathe. After lying on the table for about two minutes it was put into the hot bath; the breathing continued whilst in the bath, and the animal seemed to improve. It was kept in for ten minutes, and when taken out was able to walk. It seemed to go on tolerably well at first, but five hours after submersion it appeared very sickly and the respiration was hurried. Seven hours after the experiment the animal was alive; before the next morning, viz., within twenty hours of submersion, it was dead.

Although the experiments alluded to in the tables are not very numerous, yet, from the marked results obtained, it appears to me that they are sufficient to establish the principle of the injurious effects of the hot bath, at any rate on the class of animals which were the subjects of experiment; and I think we are justified in extending the principle to man. Many physiologists have deprecated the employment of the hot bath in asphyxia, but I am not aware that any experiments have ever been performed previous to my own which show its pathological effects on the lungs, and the manner in which, if had recourse to when respiration is feeble, it tends to destroy life some hours after its use. The recognition of these pathological facts must surely influence our practice, and tend to place our treatment of asphyxia on a more rational and scientific basis.

The following appears to me to be the way in which the hot bath acts:

By its stimulating influence it produces for a time an increased action of the heart, whereby more blood is sent to the lungs. Respiration being *nil*, the blood does not pass freely through the lungs, and hence their vessels become loaded. Some blood, however, finds its way to the left ventricle, which, from its imperfect action, is unable to get rid of its contents; the ventricle thus becomes distended, and subsequently arrested in its contractions. The circulation, although momentarily excited, ceases at an earlier period than when the bath is not used. Again, when respiration is being imperfectly carried on, the bath produces pathological results similar in their nature to those which it causes when respiration is suspended, viz., "engorgement" of the lungs and subsequent arrest of the heart's action. In one instance I have seen the hot bath produce convulsions, probably from causing an increased formation of carbonic acid and its circulation in larger quantities to the nervous centres.

From the foregoing experiments and observations the following conclusions are drawn:

1. In dogs, rabbits, and cats, when asphyxiated by submersion, the ventricles of the heart do not, as a rule, cease to contract "in a few minutes after the cessation of the functions of animal life," but in many instances their action continues for a very considerable period; in all probability the same remark applies to man, and serves to explain how recovery has taken place after lengthened submersion, a circumstance which has been by many attributed to the fact of syncope having occurred at the period of immersion.

2. In cases of asphyxia where respiration has altogether stopped, the effects of the hot bath are to produce an accumulation of blood in the lungs and on the left side of the heart, together with a tendency to coagulate on the part of the blood. It does not tend to prolong the action of the heart, but rather to paralyse its movements and diminish the duration of its contractions. It does not excite respiratory efforts, and prevents artificial respiration from being properly carried out.

3. In cases of asphyxia where respiration has been re-excited, and is being feebly carried on, the hot bath, although in some instances it seems to have no immediate bad result, yet has a tendency to produce a fatal issue, some hours after its use, by causing extreme congestion of the lungs, together with consolidation and collapse of the pulmonary tissue.

The practical inferences to be drawn from the above conclusions with reference to the treatment of asphyxia seem to me to be the following:

1. That efforts should be made to restore suspended animation in all cases where asphyxia has not been of a *very* prolonged duration.

2. That, considering the effects of the hot bath, its prolonged use, whether respiration has ceased or is feebly going on, is not only inefficacious, but dangerous; and even to its temporary use—as, for instance, when the body is plunged into the bath and immediately withdrawn—there are serious

objections, as it causes a loss of valuable time, and produces no direct benefit.

The object of the hot bath can only be to excite respiratory movements; these will probably be better brought about, so far as an influence of this kind can have any result, by alternately dashing hot and cold water over the body, or by the application of hot and cold cloths, &c.

3. That, judging from the increased mortality of the animals experimented on, which were put into the hot bath, as compared with those not so treated, it is safer practice, and more likely to lead to a favorable issue, to omit all artificial aid in cases where respiration is feebly going on, than to make use of the hot bath.

4. That in the treatment of asphyxia all our efforts should be primarily directed to restoring, or continuing, as the case may be, the respiratory movements, and that all measures which have a tendency to load the lungs or embarrass the respiration should be avoided.

From my own observations in a case in which I succeeded in restoring suspended animation, from experiments I have performed on the dead body, and from the numerous instances of recovery that have taken place from its use, I am induced to believe that the best method we are yet acquainted with, of producing artificial respiration, is that recommended by Dr. Marshall Hall.

Although not directly bearing on either of the questions to which my experiments more particularly refer, there is one point in connection with the morbid condition of the animals to which I wish to direct attention, viz., that whenever a pulmonary vein was cut, especially in those animals which were not put into the hot bath, the blood flowed freely and relieved the distension of the right side of the heart and of the pulmonary artery. This fact seems to me to prove that, whatever may be the proximate cause of the arrest of the circulation in asphyxia, no condition, either of blood-vessels or blood, is produced such as to cause a

mechanical impediment to the passage of the latter fluid through the various vessels of the lungs; and the fact appears to me to oppose a strong argument against any theory which would account for the cessation of the circulation, on the supposition that, either in the pulmonary capillaries or in the radicles of the pulmonary veins, such actual obstruction exists.

LETTER TO THE PRESIDENT OF THE
ROYAL MEDICAL AND CHIRURGICAL SOCIETY,

RELATIVE TO THE PRECEDING PAPER

ON ASPHYXIA AND THE USE OF THE HOT BATH,

BY

A. T. H. WATERS, M.D.,

FROM

SIR BENJAMIN COLLINS BRODIE, BART., F.R.S.,
SERJEANT-SURGEON TO THE QUEEN, ETC.

Read May 28th, 1861.

MY DEAR SIR,—I have read the report of a discussion at a late meeting of the Royal Medical and Chirurgical Society relating to the treatment of drowned persons; and with so much the more interest, as it is a subject which I had taken much pains to investigate in the early part of my life.

I trouble you, however, with this communication merely for the purpose of referring to a very important question, which, if I may judge from what I have read, did not sufficiently engage the attention of the Society on the late occasion, namely, the period of the continuance of the heart's action in the so-called (or, rather, miscalled) cases of asphyxia.

I have never, in any experiments which I have made on

full-grown, warm-blooded animals, known the heart to continue to contract after complete submersion so as to maintain the circulation of the blood for more than a very few minutes, probably four or four minutes and a half at the very utmost. But if the thorax of the animal be opened and the heart be exposed to air, some contraction of the muscular fibres, both of the auricles and ventricles, may be observed even at a much later period than that which I have mentioned. These contractions, however, are not to be confounded with the rhythmical contractions of the different parts of the heart in succession which are necessary for the circulation of the blood, and are of no more value than the quivering motions of the *panniculus carnosus* of the bullock which any one may witness in a slaughter-house.

My experience has led me to believe that when, in a case of asphyxia, the rhythmical action of the heart has once ceased, it can never be restored. It is quite otherwise where the action of the heart has ceased in a case of syncope; the difference being that in the last-mentioned case the left side of the heart is filled with scarlet blood, while in the former case the heart has continued to circulate dark-coloured blood, without any renewal of the changes which are produced in it by respiration, and without which it is unfit for the maintenance of life.

It may be worth while for me to mention, in connection with these last observations, that the late Mr. Woolley, who had great experience in these matters, informed me that he had known one case of a girl who had recovered after having been exactly six minutes under water, but that it appeared in evidence that she had fallen into the water while in a state of syncope.

I am, dear Sir,

Yours truly,

B. C. Brodie.

Dr. Babington,
&c. &c.

A CONTRIBUTION

TO THE

PATHOLOGY OF THE PONS VAROLII.

BY

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Received April 22nd—Read May 14th, 1861.

As the following cases illustrate, to some degree, the physiology and pathology of the pons Varolii, their communication may not be altogether without interest. In two of them the focus of the disease was for some time small and circumscribed; there was no complication with affections of other portions of the cerebrum, nor was there any disturbance in the encephalic circulation. These two cases exhibited, therefore, if I may use the expression, experiments performed by nature with greater accuracy than we shall ever be able to practise in vivisections.

Case 1.—*Summary.*—A tuberculous subject had first vertigo, then motor paralysis in the limbs of the right side, afterwards anæsthesia in the left side of the face; later, also diminished sensation in the limbs of the right, and diminished motion in those of the left side; contraction of both pupils, especially the right; eighteen hours before death

attack of convulsions, followed by loss of power of articulation and deglutition, perfect motor paralysis and anæsthesia in limbs of right, imperfect in those of left side; without loss of consciousness. Tubercle in left half of pons Varolii, with softening in circumference, and hæmorrhage in the latter.

P. S—, æt. 25, a journeyman baker, has been affected with tubercles of the lungs, probably since 1848; has been an in-patient of the German Hospital in 1852, when he suffered from hæmoptysis, with signs of tubercular deposit in the right apex. In the same year patient had typhoid fever. In 1853 he enjoyed good health, with the exception of a moderate cough, which never prevented him from working. In February, 1854, he felt repeatedly giddy, the right arm became weaker, and later, also the right leg, but not to the same degree as the arm, the cough and general health remaining unchanged.

On May 15th, 1854, I found patient in the following condition :—he is of middle stature, moderate muscular development; scarcely emaciated; feels himself well with the exception of the weakness in the right side; cough not troublesome, although the physical phenomena of pulmonary phthisis are quite distinct, especially in the upper portion of the right lung; the urine contains no albumen; the right arm is much weaker than the left, but not completely paralysed; the muscles are thinner than those of the left arm, rather flaccid; the right leg is likewise weaker than the left, but the difference is not so great; patient is able to walk without a stick; sensibility unchanged; intellectual faculties unimpaired; there is occasional vertigo, especially through sudden change of position.

Five grains of iodide of potassium were ordered three times a day.

June 10th.—General health unchanged; pulse 80 to 90, regular; paralysis in right arm and leg increased; sensibility unchanged; right side of face unaffected, as well with regard to motion as to sensation; left half of face rather

numb ; feels the points of the compass less distinctly on that side than on the corresponding places of the right ; vertigo more troublesome, frequently brought on by cough ; senses unchanged, but both pupils rather narrow, right more so than left.

The doses of iodide of potassium to be increased to six grains. Half an ounce of Oleum Morrhuæ twice a day.

30th.—General health and spirits so good that patient contemplates an early return to Germany. Paralysis of right arm and leg slightly increased ; right arm perceptibly thinner than left, flaccid ; difference in nutrition of lower limbs less marked ; numbness of left side of face increased ; sensibility of inner side of left cheek, of gums of left side, and of left half of tongue, diminished (tested by compasses, caustic ammonia, galvanism, and various degrees of temperature, viz., pieces of steel previously dipped alternately in rather hot and in iced water). Taste on both halves of the tongue equal; hearing on both sides the same; conjunctiva of left eye injected, with increased secretion in the morning; sight good ; pupil as above.

July 10th.—Two days ago patient exerted himself much by walking, afterwards took some spirits, became soon intoxicated, although, as he says, he had taken only a small quantity of spirits compared with former times ; while drunk, he had a fall in the street, and was carried home, but was never quite unconscious. At present he looks weaker, and is much depressed in spirits ; has no pyrexia ; skin is cool ; pulse 95 to 98, weak, regular ; appetite less good ; bowels moved only through aperient medicines (pilul. Rhei co.) ; cough increased, disturbs sleep ; urine free from albumen and sugar. Paralysis of right arm and leg increased; mastication impaired ; bites less hard on left side than on right ; tongue protruded in middle line ; anæsthesia in left side of face augmented ; feeling in right arm and leg less distinct than in left ; redness of conjunctiva of left eye rather increased ; pupils narrow, especially that of right eye—do not dilate completely under the influence of want of light.

The eighth of a grain of Morphiæ Acetas was ordered to be taken three times a day. Omit other medicines.

15th.—Right arm and leg almost motionless, bent, rather rigid; increased weakness in left arm; mastication and deglutition difficult; feeling of numbness in right hand and foot; sensibility decidedly decreased, shown by compasses; redness of left eye more apparent; eyelids rather swollen, sticking together in the morning.

21st.—Expression of great anxiety in countenance; cough much diminished; pulse 110 to 112, very feeble; temperature scarcely altered; limbs of right side more contracted; left arm weaker than before; left leg, too, is weaker; deglutition of solids difficult; articulation rather indistinct; both pupils are narrow, and dilate only slightly under the influence of darkness.

14th.—While sitting up, patient was suddenly seized with vertigo and general convulsions. After a few minutes he seemed to have regained his consciousness, and to recognise those around him. An hour and a half after this paroxysm he was found by myself in the following condition:

Posture, on back, with expression of great anxiety; when asked how he feels, he answers only by moaning. Pulse 140, very feeble. Limbs of right side in state of flexion, rigid, perfectly motionless; those of left side scarcely ever, and then only slightly, moved. Articulation destroyed; the only sounds produced consist in a more or less loud moaning or screaming. When asked to show the tongue, patient only opens the mouth. Deglutition very defective. When any fluid is offered to drink, the countenance assumes an expression of horror, and patient screams in a pitiful manner; the attempt to swallow a few drops of wine causes a most distressing fit of coughing. When the right foot is slightly pinched, no movement takes place; when severely pinched, the great toe moves a little, no alteration whatever taking place in the expression. When the left foot is rather intensely pinched, the toes of the same foot manifest a slight movement, without there being any change in the expression

of the face; but when the left foot is severely pricked, this foot is distinctly drawn away, the face expresses pain, and the patient groans.

Patient is evidently conscious, and knows those around him. The pupils of both eyes are extremely narrow; seeing and hearing are undisturbed.

About twelve hours later dyspnœa and stertorous breathing commenced, and death ensued eighteen hours after the paroxysm of convulsions, patient having exhibited signs of consciousness only a short time before his death.

Post-mortem.—The examination of the head, twenty-eight hours after death, manifests nothing abnormal in the cerebrum and its ventricles. The pons Varolii, inspected from below, appears larger than usual; the left half is rounder and larger than the right; the left trigeminal nerve is about one fourth smaller than the right. A transverse incision into the pons, from the left to the right fifth nerve, exhibits in the lower or anterior[1] part of the left half, close to its periphery, a round, rather hard tumour, of yellowish-white colour, of about half an inch in diameter. The surrounding tissue is in a state of red softening, which extends posteriorly almost to the floor of the fourth ventricle, to the right considerably beyond the middle line, and in the direction from the medulla to the crura cerebri about two lines either way. In the softened tissue there is a recent effusion of blood loosely coagulated, amounting to about as much as finds room in a small hazel-nut. It has forced its way in various directions in the softened tissue, and also between the normal fibres beyond the middle line, viz., into the right half of the pons.

The cerebellum and the medulla oblongata appear normal.

No microscopic examination was performed, as we were not permitted to take away any portion of the body.

The inspection of the chest and abdomen was not allowed.

[1] The expressions "lower" or "anterior" are applied to the portion of the pons corresponding in situation to the anterior portion of the medulla.

Three periods may be distinguished in the history of this case—the first from the beginning of the head symptoms in February until July 8th; the second from that time until July 14th; the third comprising the last eighteen hours before death. The *first* period is characterised by attacks of giddiness, and by motor paralysis in the limbs of the right side, appearing first in the arm, afterwards in the leg; the right side of the face, as also the sensitive functions of the limbs remaining unaffected. The motor paralysis of the right arm and leg was soon followed by anæsthesia of the left side of the face and left half of the tongue, and by a contracted state of the pupils, especially the right. There was scarcely any disturbance of general health. These symptoms we consider as corresponding to the growth of the tubercle in the lower or anterior part of the left half of the pons Varolii, pressing on the peripheric origin of the left quintus. The *second* period exhibits the phenomena of the first in an increased manner; and besides these, contraction and rigidity of the paralysed limbs, as also commencing anæsthesia in the same; further, incipient motor paralysis in the limbs of the right side, and impeded mastication and deglutition. Rapidly increasing softening in the neighbourhood of the tubercle, extending to the tissue of the right half of the pons, and to the upper or posterior [1] layers of the left half, probably represents the anatomical condition of this period. Bodily over-exertion and intemperance seem to have hastened the development of this alteration. The *third* period sets in with a paroxysm of general convulsions, after which the consciousness and the senses of sight and hearing appear unimpaired, while the motor and sensitive paralysis of the limbs is much increased, the reflex function not being quite destroyed. The powers of articulation, deglutition, and protrusion of tongue, are totally lost. Death seems caused by suffocation. Hæmorrhage into the softened tissue, disturbing by pressure also

[1] The term "upper" or "posterior" layers of the pons is applied to those corresponding, in situation, to the posterior portions of the spinal marrow.

the function of the adjacent healthy parts, is the cause of the phenomena of this last period.

CASE 2.—*Summary.*—Boy, æt. 7, affected with chronic hydrocephalus and tuberculosis; six months before death attacks of convulsions in left arm and leg; pain in right side of face; later, motor paralysis in limbs of left side, anæsthesia in right half of face; consciousness undisturbed; contraction of pupils, especially left; paroxysms of general shaking; four weeks before death rigid contraction of paralysed limbs; death under symptoms of tubercular meningitis. Tubercle in right half of pons Varolii, near origin of right quintus, with atrophy of the latter; red softening round tubercle; phenomena of tubercular meningitis.

C. L—, a boy, æt. 7, came, towards the middle of June, 1856, under my treatment at the German Hospital. He belongs to a scrofulous family, and has lost several brothers from "hydrocephalus." Patient himself has been affected with chronic hydrocephalus from his second year, has often been an out-patient at the hospital, twice with symptoms resembling tubercular meningitis, viz., headache, pyrexia, vomiting, constipation, and irregular and rather slow pulse. He has a large head, with small face, old features, and intelligent expression. Since the beginning of 1856 the child has been affected with occasional feverishness and cough, and has become considerably emaciated, in spite of the use of cod-liver oil. Towards the end of May he has had, for the first time, convulsions in the left arm during about two minutes, without loss of consciousness. A similar attack occurred several times in the course of the following weeks.

On June 12th, patient was ordered to resume the cod-liver oil, which had been left off for some weeks, and to take, in addition, three grains of iodide of potassium three times a day.

June 19th.—Has had five attacks of convulsions in left arm during the last seven days. In the intervals the phe-

nomena of motion and sensation in limbs and face are normal; the pupils are equal, and contract well. Pulse 80 to 85, regular.

July 1st.—Four fits of increased strength and duration, affecting also the left leg, though to a less degree than the arm. The boy cries during the fit, without losing his consciousness; the cause of the crying appears to be not so much pain as fright. Has repeatedly complained of giddiness, while walking. Both pupils are rather narrow. Cough has almost ceased. Bowels rather costive.

15th.—Has had six fits of convulsions in left arm and leg; the left side of face does not participate. Giddiness increased. Frequent pain in right side of face, especially in the lower teeth, sometimes, however, also in the upper ones; a chemist has extracted, without legitimate advice, two sound teeth, no abatement of pain having followed.

August 11th.—Fits more frequent, but less strong; left arm is distinctly thinner and weaker than right; left leg, too, is weaker, but not in the same degree. Pain in right half of face continues, and extends also over forehead. The pain is at times very great, at times almost absent. Cough has disappeared completely. Costiveness continues. Pulse 75 to 82.

September 8th.—Limbs of left side very weak, emaciated, flaccid. Sensation in limbs of both sides equal. The convulsions in left arm and leg are so slight that they resemble a kind of trembling, recurring in attacks. The pain in the right side of face has almost ceased, but the sensation in the same part of the face is perceptibly diminished. Both pupils are narrow, especially the left; they do not sufficiently dilate under the influence of darkness. Consciousness unaffected. Colour of face pale. Pulse 82 to 88, feeble.

A teaspoonful of steel wine with two teaspoonfuls of cod-liver oil was administered twice a day.

October 13th.—Motor paralysis and emaciation of left arm and leg increased; temperature in the same lower than in the limbs of the other side; frequent attacks of trembling

in the paralysed limbs. Patient has had several attacks of shaking of the whole body, lasting about eight or ten minutes, without loss of consciousness. Urine is free from albumen and sugar, often forming sediments of lithates.

November 18th.—Limbs of left side are now completely paralysed and flaccid. Both sides of the face are symmetrical, and move equally. Tongue protruded in middle line. The attacks of shaking are less violent, the paralysed limbs are moved less during the shaking than those of the right side. Sensation in right side of face and right half of tongue decidedly less delicate than in left; taste on both halves of tongue equal; sight and hearing normal; pupils very narrow. Respiration during sleep very irregular; articulation rather indistinct.

December 5th.—Limbs of left side rather rigid, in semi-flexion; voice more thick; occasional difficulty in swallowing. Consciousness undisturbed.

16th.—During the last days great irritability of temper; headache; occasional vomiting; increased constipation, with sunken stomach; pulse 75, not quite regular; pupils narrow, as before.

Four grains of iodide of potassium were now given four times a day. Calomel gr. iss, with jalap gr. vj, at bed-time.

24th.—The child has been in a comatose condition since 22nd; he can be roused for a moment; looks then like one awaking from a dream; occasionally gives a reasonable answer, but immediately falls into his former state of coma, when left to himself. Frequent twitchings of small fascicles of muscles are perceptible to the eye and the touch; pupils larger than before, almost motionless; pulse 62 to 66, unequal in strength and rhythm.

27th.—Has had an attack of general convulsions, more in the right side than in the left; is unconscious; pulse very frequent and feeble; pupils much dilated, without any reaction.

Death on December 31st.

Post-mortem.—Numerous tubercular granulations in pia mater, especially in fossa Sylvii, most abundant along the course of the blood-vessels. The lateral ventricles much enlarged, filled with almost transparent fluid; the walls of the ventricles and the septum softened. The substance of the hemispheres rather soft, otherwise normal; the aquæductus Sylvii enlarged, as also the fourth ventricle and the upper part of the central canal of the spinal marrow. On the upper surface of the cerebellum, in the pia mater, many granulations; the substance of the cerebellum itself normal. The right half of the pons Varolii, viewed from below, is decidedly larger than the left, especially near the peripheric root of the right trigeminus, which nerve itself is considerably thinner than the left. A transverse incision, from the origin of one trigeminus to that of the other, manifests a round tubercle, with a diameter of about half an inch, situated in the lower or anterior portion of the right half, commencing about a line from the lower periphery, near the origin of the right trigeminus. In the circumference of the tubercle the nerve-substance is softened, of a yellowish-red colour; the softening extends from half a line to about a line in the various directions; towards the middle line it does not quite reach the centre. The cut surface of the tubercle is of yellowish-gray colour; the consistence is softer in the centre than in the circumference. The microscopic examination of the tubercle itself manifests the well-known constituents of such growths; that of the surrounding softened tissue exhibits a large number of granule-cells (Körnerzellen), together with broken nerve-fibres, numerous fat-globules of various size, many isolated granules, and amorphous matter. The fibres of the sensitive root of the right quintus appear thinner than those of the left; in many of them rows of granules and minute fat-globules are seen.

The bronchial glands are much enlarged, with scrofulous infiltration. Both lungs contain many isolated tubercles; the pleura and the peritoneal covering of the liver, spleen, and intestinal canal, are studded with tubercular granulations, similar to those in the pia mater.

In this case, again, we may, for the sake of conveniently analysing the phenomena, adopt three periods, viz., the first, from the beginning of the cerebral phenomena in May until to the second half of November; the second, from that time to the middle of December; the third, from that time until death. In the *first* period we remark attacks of convulsions, first in the left arm, then also in the left leg, without loss of consciousness, and without alteration of sensation in the limbs; we, further, find pain in the right side of the face, of varying intensity; occasional giddiness; contraction of pupils, especially the left; wasting of limbs of left side; paroxysms of general shaking. The anatomical alteration existing and developing itself during this period was the small tubercle in the right half of the pons, near the root of the right trigeminus. In the *second* period we observe, in addition to most of the preceding symptoms, contraction of the paralysed limbs, anæsthesia of the right side of the face, slight difficulty in articulation and deglutition, and irregularity of breathing, principally during sleep. In this period we may suppose the red softening in the circumference of the tubercle to have been developed, together with some degree of atrophy of the right trigeminus. The phenomena of the *third* period are those of the tubercular meningitis, on which we will not now dwell.

In comparing these two cases, in which the anatomical alterations were, to all appearance, in the beginning almost the same, we remark that in both, motor affection, first of the arm, and afterwards also of the leg of the opposite side, together with attacks of vertigo, were the first phenomena to attract our attention; in both cases the sensibility of the affected limbs remained for a long period unchanged, and the side of the face opposite to the lesion was altogether unaffected; in both cases contraction of the pupils of either side, especially of the opposite, was an early phenomenon; in both sensitive affection of the corresponding half of the face and mucous membrane of the mouth and tongue; in both, at a later period, wasting of the paralysed limbs, and still later, rigidity of the same, impaired articulation, deglutition, and

respiration. The intellectual functions and those of the special senses appeared throughout uninfluenced. Striking, but probably not essential, differences were, in the commencement, the convulsions in the opposite arm and leg, preceding the paralysis in the second case; the pain in the corresponding side of the face preceding the anæsthesia, and later, the paroxysms of trembling in the affected limbs, and of general, rather violent, shaking. In the first case we have, during the second period, anæsthesia coming on in the limbs of the opposite side, and incipient paralysis in those of the corresponding side, while these conditions are absent in the second case. The symptoms of both cases were very different in the last period, but this requires no explanation, considering the palpable differences in the anatomical conditions.

Much might be said with regard to the conditions causing the appearance of certain symptoms in one case which are absent in another, in spite of the similarity of the anatomical alterations; but we will, at present, refrain from such surmises, mentioning only that we cannot consider those symptoms which were present during the first period (tubercle, without softening in circumference) only in one of the two cases as necessary effects of the local alteration in all cases, but must ascribe them to a peculiar disposition in the case in which they occur. We often see in brain diseases, and in affections of the nervous system in general, that the seat of the organic lesion is not the seat of the functional disturbance, and that the same organic lesion may, according to individual differences of disposition, cause disturbance in different portions of the nervous centre, and thus cause different symptoms in different cases. Lesions of different nature, and situated in different localities, may, on the other side, cause functional disturbance of the same portions of the brain, and thus produce the same symptoms. The fits of shaking, for instance, were certainly not necessarily due to the anatomical alteration of one side of the pons, as they were absent in the first case and in many others of similar nature; they are occasionally present, on the

contrary, in diseases of the cerebellum without any alteration in the pons Varolii.

Respecting the differences in the second period, we may, with good reason, explain some of them by the anatomical conditions. Thus, in the first case, the softening extended to the upper or posterior part of the pons; in the second, scarcely beyond the middle of its antero-posterior diameter; in the first case we have anæsthesia of the limbs of the opposite side, in the second sensation remained unimpaired. In the first case the softening extended beyond the middle line into the other half of the pons, in the second it did not reach the middle line; in the former we have, towards the end, incipient paralysis of limbs of the side of the original disease, in the latter no such phenomenon has been observed.

With regard to the diagnosis, it was in both cases quite possible to arrive, at all events, at an approximative one long before death. The manner in which we argued was this:—the motor paralysis of the limbs of the right side, in Case 1, unattended with any disturbance of the intellect, made the existence of an alteration in or near the left half of the basis of the brain probable; the numbness in the left half of the face appearing soon after the paralysis of the limbs, suggested that the alteration in question was in close connexion with the root of the left quintus; the fact that the second, third, fourth, sixth, and seventh nerves were unaffected, showed that this alteration was of a very limited circumference; the further considerations that the lesion was gradually but slowly increasing, and that it occurred in a tubercular individual, made us surmise that it consisted in a tubercle, either in the substance of the left half of the pons Varolii or in close apposition to it, pressing on the left quintus. The affection of both pupils might have rendered the existence of the tumour within the substance of the pons rather more plausible, but this fact was, at the time, not sufficiently taken into account. The reasoning in the second case was very similar to that in the first.

Among the physiological inferences which may be drawn from these two cases we remark especially—1. That the conducting fibres for the limbs passing through the pons, as well the motor as the sensitive, decussate below the pons. 2. That there are no sensitive fibres for the limbs in the lower or anterior part of the pons. 3. That the upper or posterior part of the pons contains sensitive fibres for the limbs. 4. That the intellectual functions of the brain are independent of the pons Varolii. 5. That the nerves regulating the state of the pupils seem to be in close connexion with the pons Varolii. As well in the two cases just related as also in two others which I have observed, there was a marked contraction of both pupils, and more so on the side opposite to the lesion. 6. Extensive lesion of the pons seems to be associated with disturbance of deglutition, articulation, and also respiration; but it is possible that these phenomena do not depend so much on the alteration in the pons itself as on the influence exercised through it on the adjacent parts of the medulla oblongata.

Several of these inferences are corroborated by the following case, which I attended at the German Hospital, together with Dr. Frommann, the late resident physician, to whom I am indebted for the greater part of the notes.

Case 3.—*Summary.*—A middle-aged woman was affected fourteen weeks before death, with motor paralysis of left side, with only transitory disturbance of sensation; gradual, but imperfect, recovery during the ten following months. On seventh day before death loss of articulation and deglutition, almost complete paralysis of all the limbs, contraction of pupils; death from the lungs. Remains of hæmorrhage on outer side of right corpus striatum; softening of the centre of the pons.

E. S—, æt. 49, a married woman, during the last ten years subject to privation and cold, during the last six years

often affected with bronchitis, was in September, 1858, suddenly deprived of the use of the left side of the body, without loss of consciousness; the left arm and leg were completely motionless and flaccid, the left side of the face nearly so; the uvula was slightly drawn to the right; the tongue, when protruded, pointed to the left; the larynx just appreciably moved to the right; sensibility in left arm and leg diminished (as tested by Sieveking's æsthesiometer); there were some sores, as from rupia, on various parts of the limbs, making us suspect complication with tertiary syphilis, the presence of which was, however, not distinctly proved. Under the influence of rest, nourishing diet, and iodide of potassium, the patient gradually recovered the use of her leg almost completely, that of her arm to a less degree; the anæsthesia had disappeared already after four or five days, the paralysis of the face and tongue after two or three weeks.

On December 30th, 1858, patient lost, according to the report of the relatives, almost suddenly, the power of speaking and swallowing, and the use of all her limbs. On January 1st, 1859, she was again admitted into the German Hospital, where the following notes were taken. Posture, on back. Expression of face as in pain and alarmed, sometimes to the extreme, especially when she is offered something to drink. The attempt to swallow, even as little as half a teaspoonful of wine or beef-tea, causes the most distressing fits of coughing; face slightly drawn to the right, but muscles of both sides can be moved; tongue cannot be protruded; when asked to show it, patient opens the mouth wide, but the tongue is scarcely seen to move; power of articulation destroyed, the only sounds uttered consisting in more or less loud moaning; right arm completely paralysed to motion and sensation; left arm nearly so, both being flaccid; the lower limbs can be moved only to a very limited degree; moderate pricking and pinching of the toes causes a distinct movement of the toes, but does not seem to be perceived by the patient, to judge from the expression of the face; severe pinching or pricking causes a change in the expression of

the face and moaning, the whole foot, at the same time, being slightly moved away; both legs are flaccid; patient is evidently conscious, knows those around her, hears and sees; both pupils are rather narrow, and do not fully dilate. Urine and stool passed in bed, apparently without being perceived by the patient; skin rather cool; pulse 125 to 130, very weak.

On January 5th dyspnœa and irregularity of breathing were first observed, followed, after some hours, by stertorous breathing and death, without accession of convulsion, the patient having remained conscious to the last.

Post-mortem.—The examination of the brain manifests the remains of an old clot of blood, not yet quite absorbed, close to the anterior and exterior portion of the right corpus striatum. The remainder of the hemispheres is normal, as also the cerebellum; the pons Varolii, when merely looked at, appears likewise normal, but by making vertical sections it is seen that in the centre of the superior part, viz., that nearest to the crura cerebri, a portion of the size of a small hazel-nut is softened. The colour of the softened spot is yellowish-gray, slightly darker in the middle, where the softening is most complete, while in the circumference, where the consistency approaches the normal, the colour is scarcely different from that of the unsoftened portion. The surrounding tissue appears unaffected, as well as the whole of the inferior (nearest to the medulla) and posterior or upper part (floor of the fourth ventricle), and the medulla oblongata. Thin slices of the softened tissue become, when a stream of pure oil of turpentine is passed over them, almost transparent; the tissue, however, is so much softened that it is impossible, even after hardening it with absolute alcohol, to cut slices thin enough for microscopic examination in larger pieces. The use of higher powers shows in the centre of the softening scarcely any fragments of nerve-fibres, a great many oil-globules, small granules, and amorphous matter, but no granule-corpuscles (Körnerzellen). In the circumference of the softened spot the nerve-fibres become prevalent, the

oil-globules and amorphous matter are seen in smaller proportion, but likewise no granule-corpuscles.

Both lungs are emphysematous. The lower lobe of the right lung is in the condition of red hepatization, that of the left is likewise much congested. The heart is flaccid, but otherwise normal, without signs of fatty degeneration or valvular disease. The kidneys, too, are normal.

ON

DISEASE OF THE KIDNEY,

ACCOMPANIED BY

ALBUMINURIA.

(SECOND PAPER.)

BY

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IN a paper printed in the last volume of the 'Transactions' of this Society, I examined pathologically those alterations of the kidney which have been loosely described as Bright's disease. I endeavoured to show that there are two essentially different diseases which have been so denominated. One, which is characterised by increase of bulk, the surface remaining smooth, is owing to an inordinate secretion within the tube. This, in its nature, is nephritis, or, to apply the language of Dr. Prout, "hæmotrophy;" I therefore may be permitted to use the terms *chronic nephritis, tubular disease,* and *smooth, mottled kidney,* as synonymous. The other disorder produces for the most part diminution of size, renders the surface uneven and granular, and is the result of an affection of the intertubular structures. This is rather a degenerative than an inflammatory condition, and, after Dr. Prout, may be termed anæmotrophy.

I now propose to complete my sketch of the disease by filling in the clinical details, showing how, during life, the one disease may be distinguished from the other, and how far the conclusions based upon morbid anatomy are warranted by what is observed before the death of the patient.

I have extracted from the ample records of St. George's Hospital the particulars of every well-defined case of either of these disorders that was examined in the dead-house during ten consecutive years. The total number of "post-mortems" in this period was 2350, in 250 of which the kidneys were granular, in 119 smooth and mottled. An analysis of these cases may be trusted for certain deductions, while other particulars will be drawn from cases under my own observation in the wards, making use only of those in which the state of the kidney has been attested by post-mortem examination.

It will be convenient to ascertain, first of all, the sex, age, and constitutional tendencies of the persons affected with either of these disorders.

They both occur more often in the male than in the female sex. Out of the 119 cases of the smooth kidney just alluded to, there were 87 males to 32 females, a proportion of nearly 3 to 1. With regard to the granular kidney, the preponderance is on the same side, though to a rather less extent. The 250 cases were distributed between the sexes in the proportion of 165 male to 85 female, or very nearly 2 to 1.

There is a great difference as to the age which each selects. The accompanying tabular statement will sufficiently show that the tubular disease chiefly affects the earlier periods of life, occurring even in infancy; that it is most frequent between the ages of twenty and thirty, while old age is nearly exempt from its attacks.

The granular kidney is distributed in inverse proportion; it chooses that portion of life which is untouched by the other. No instance was met with before the age of eighteen. It is most common between forty and fifty, and sometimes is seen even at the most advanced periods of existence.

Table, showing the ages at which the two diseases terminate.

	Ages, in years.								
	1 to 10.	11 to 20.	21 to 30.	31 to 40.	41 to 50.	51 to 60.	61 to 70.	71 to 80.	81 to 90.
Nephritis, 117 cases	10	16	39	23	20	8	1	0	0
Granular degeneration, 243 cases .	0	2	17	38	73	55	43	12	3

Placing the same facts in a different point of view, I may state that in 106 cases the average age at which the smooth kidney, yet uncontracted, appeared in the dead-house, was 28·2 years. Of the rare stage of the disease, where it had led to wasting of the organ, the average, in 11 cases, was 43·6 years. In 250 cases of the granular kidney, the average age was 50·2 years.

These facts, which need no comment, would afford, independently of all other evidence, a strong presumption that the two disorders depend on essentially distinct tendencies.

It appears that there are certain predispositions which favour the development of one disease rather than the other. This is most conspicuous as regards gout, or what is called rheumatic gout, as has already been pointed out by the late Dr. Todd. In 83 cases under my own observation during life, and where, after death, the smooth kidney was found, there was not a single instance of the occurrence of either of these complaints. In the 119 cases spoken of before, there was one mention of gout, and that was doubtful. On the other hand, 31 cases of granular degeneration from my own notes afford no less than 10 with gouty complication; and in the 250 from the post-mortem records there was evidence of gout, chiefly in the form of chalk-stones, in 17.

It appears that the gout generally precedes, often by a

great many years, the development of the renal symptoms. A case where this went on for twenty-six years, and another for twenty, have come under my own notice. Such facts lead to the conclusion that the renal degeneration is caused by the foregoing disorder, or else that both are due to a common cause. If the gout appeared in consequence of the imperfect action of the gland, we should expect to find it in the other form of disease, where the powers of excretion are at least as much interfered with.

It further appears that a tendency to tuberculosis encourages the granular degeneration of the kidney. In 20·8 per cent. of the cases of this complaint some form of tubercle existed in the lungs. With the smooth kidney, although that disorder is most common just when the mortality by phthisis is the greatest, the disease of the lungs existed only in 16·8 per cent. of the cases observed. Regarding the matter from another point of view, I find that, out of 244 cases of phthisis examined during five years in St. George's, 46 had also granular kidneys, while in only 17 were those organs smooth and mottled. Allowing for the correspondence in time of life between consumption and the last-mentioned renal disease, we cannot hesitate to infer that the tuberculous constitution is peculiarly liable to granular degeneration of the kidney, although, of course, it does not confer an exemption from the attacks of nephritis.

Leaving out of the question the argument from morbid anatomy, these facts alone would furnish strong evidence as to the independence of the two diseases under consideration. I will now briefly review the symptoms proper to each, and show at once their points of difference and the means of diagnosis.

The accompanying table, which includes all the cases examined during ten years at St. George's, has been constructed partly from the report of the post-mortem, and partly from the history of the case which is annexed. None of the examinations were made with any especial object, and no doubt all the numbers here given are too low. This must be especially the case with such symptoms as those of bronchitis or of diarrhœa, which, should they escape mention

in the condensed history of the case, have little chance of being rendered evident by the traces they leave behind them after death.

Table, showing the per-centage of affections accompanying each renal disorder.

	Bronchitis.	Diarrhœa.	Vomiting.	Pleurisy.	Pericarditis.	Peritonitis.	Pneumonia.	Œdema.	Ascites.	Hydrothorax.	Hydropericardium.	Epistaxis.	Erysipelas.	Cirrhosis of liver.	Atheroma.	Hypertrophy of heart.	Valvular disease.	Convulsions.	Simple coma.	Sanguineous apoplexy.
Nephritis, 119 cases	18·5	20·1	26·0	64·3	27·7	25·2	20·1	66·3	33·6	28·5	24·3	0·8	15·9	10·9	21·8	24·3	17·4	10·9	10·0	2·5
Granular degeneration, 250 cases .	22·0	11·6	15·6	60·8	32·8	13·6	12·4	48·0	26·0	25·2	14·0	0·8	6·8	15·2	52·4	48·0	43·2	5·6	8·8	6·8

CHRONIC NEPHRITIS.

I need make no excuse for adopting the comprehensive term *nephritis* for what has been called the tubular disease, though the inflammatory action is seen rather in its results than its operation. As in bronchitis, so in nephritis; the inflammation may be evinced by simple excess of secretion, or of cell growth, though in the latter case mechanical injury to the organ may result from the accumulation of the epithelium.

This disorder is generally produced by some irritating matter operating on the gland. Spirits of turpentine or cantharides, given medicinally; a spell of hard drinking; bile vicariously eliminated by the kidneys; the poisons of measles and scarlatina passing from the system in the course natural to them; and, above all, by that series of pathological changes known as "catching cold," by which all the materials due to the glands of the skin are suddenly thrown upon the internal glandular organs.

Besides such causes as these, it may have its origin in venous obstruction, such as takes place in successive pregnancies, although the kidney will usually bear venous congestion patiently, as we see in many cases of valvular disease of the heart.

Thus, in thirty-eight cases under my own notice during life, and where the condition of the kidneys was verified by post-mortem examination, the cause was clearly ascertained in twenty-one—

Definite exposure to cold . . .	10
Scarlatina	8
Fit of drunkenness	1
Repeated pregnancies . . .	1
Vicarious secretion of bile . .	1

From whichever of these causes the disorder has taken its origin, its commencement is almost always definite. The change in the condition of urine is obvious, and the

symptoms are such as to command attention—aching in the loins; the urine scanty, and discoloured with blood; œdema, beginning in the face, and soon pervading the whole body. Hence it is easy in most cases to be quite sure of the duration of the disease as well as of its exciting cause. This is in strong contrast with what is observed with granular degeneration.

Once started, the inflammatory action may cause death in two or three days. The scanty urine, loaded with albumen, blood-globules, and casts of various kinds; the outbreak of dropsy; the termination by coma, and the visible congestion of the kidney after death, furnish a familiar picture of nephritis in an acute form. My purpose is chiefly with the more chronic varieties of the disorder.

The more the disease is prolonged the more the epithelial growth accumulates, and, by distending the tubes with opaque, white matter, disguises the earlier indications of congestion. When appearing as the sequel of scarlet fever, the characteristic pale colour is sooner produced than when it is a consequence of exposure to cold.

The disease usually runs a slow course, but whether the patient die during the first week or live for a year, the nature of the disorder is essentially the same. In fatal cases the ordinary duration of the disease is under six months. In thirty-four such cases under my own observation, seven terminated during the first month, eight during the second; by the end of six months twenty-six of the whole number were dead, while only two survived the year.

The symptom which is most prominent, and, next to albuminous urine, the most invariable, is dropsy. This, with the peculiar whiteness of the skin, imparts a characteristic physiognomy to the disease. It varies directly with the obstruction in the tubes and the scantiness of the urine. It invades the cellular tissue, the peritoneum, the pleura and the pericardium, with a frequency corresponding to the order in which they are here placed.

The liability of certain structures to become inflamed is

the most serious character of the disease. More cases die from this cause than from any other. Pleurisy is by far the most common result; then inflammation of the pericardium, peritoneum, lungs, and bronchial tubes, in the order mentioned. The comparatively great frequency of peritonitis and pneumonia, and the comparative rarity of bronchitis, constitute a point of difference between the disorder at present under consideration and granular degeneration.

Vomiting is more frequent than diarrhœa. It may occur at any stage of the complaint, even at the outset. Diarrhœa, although not diagnostic of the disease, is greatly more frequent than with granular degeneration, even more so, according to my own experience, than the foregoing table shows. It comes on in cases of some standing, it generally causes the dropsy to subside, and often occasions the death of the patient by the exhaustion which results.

Pain in the loins is a symptom of considerable value, as a means of distinction between one and the other disorder. It accompanies most examples of the complaint now under consideration, while it is very rare as a result of the more chronic disease. A converse statement may be made with regard to a less serious inconvenience. Frequency of micturition seldom accompanies the smooth, mottled kidney, while it is seldom absent from the granular. This symptom, as has been observed by Dr. Prout, is most marked when the patient is in the horizontal posture.

With regard to the "head symptoms" in connection with this disorder, though it is not uncommon for acute cases to lapse gradually and quietly into a state of coma, yet in the chronic form the final coma seldom appears except as the sequel of epileptic convulsions, though these often occur and pass off without any immediate evil. They are often foretold by pain in the head, and are, as has been pointed out by Dr. Bence Jones, especially apt to come on in persons who suffer from vomiting and diarrhœa, as if these symptoms are promoted, if not produced, by an anæmic state of brain. It also appears that patients who

have been taking stimulating diuretics, such as tincture of cantharides, are particularly liable to be so affected.

When it is considered that almost all the symptoms I have enumerated are very indirect consequences of the disease, a high value will be attached to the direct evidence of the state of the kidney which is furnished by the urine.

This is usually diminished in quantity; at first invariably so. During the more advanced stages of the disease, or as a temporary attack is passing off, it sometimes becomes more than naturally profuse.

It is acid in the great majority of cases; when alkaline or neutral, it is under the conditions mentioned as increasing the quantity of the secretion. Uric acid crystals and urate of soda are often present.

It is discoloured with blood in a large proportion of cases, especially at the outset; the more so the more acute the affection. If the mixture present a pink tint, instead of the usual smoky or cairngorm colour, this is due not to any peculiarity in the hæmorrhage itself, but to the want of acidity in the urine.

The albumen is almost always considerable, the coagulum bulky in proportion to the quantity of urine tested; the fluid sometimes even gelatinous when boiled.

The specific gravity varies greatly, ranging between 1010 and 1030, or even more widely; in the majority of cases, however, departing little from the limits of health. Thirty-seven cases, attested by post-mortem, where the urine was repeatedly examined during life, gave an average of 1019.

The microscope is more useful in confirming a diagnosis formed upon other evidence, than as an independent guide. It is usual to find, especially in the earlier stages of the renal catarrh, a large deposit of loose epithelium. As the disease progresses this may undergo a metamorphosis into pus, or the cells may become charged with oil globules. These alterations of course correspond with like changes within the secreting tubes. The phase of chronic nephritis indicated by the shedding of fatty epithelium, runs a course so parallel to the cases where no such degeneration takes place, that it

can only be discriminated during life by the microscopic examination of the urine, and no clinical division has been here attempted. It appears to be particularly apt to occur in such cases as owe their origin to cold; and is of course an unpromising complication. That the tissues of the body should become fatty under the influence of inflammatory action is what daily experience teaches.

Casts of the tubes are almost always present in the disorder now under consideration. The fibrinous exudation which forms their basis is derived chiefly from the cones, as is evident from the fact that after death it is often seen filling the tubes in this portion of the organs, while none is seen elsewhere. The cylinders found in the urine are therefore, strictly speaking, *casts* of the straight tubes, though some of their materials may be furnished by other portions of the gland. The nature and quantity of the epithelium passing from the secreting tube, and the absence or presence of hæmorrhage, will of course be indicated by their variations.

The casts found in this disorder—and indeed casts in general—may be thus classified:

1. Transparent, glassy cylinders, usually narrow and uniform, though sometimes dotted with minute oil globules.

These may occur as the result of a passing attack of congestion in a kidney otherwise healthy. They appear in all stages of the complaint, whenever, either from the cessation of the morbid action, or from being immoveably plugged up, the secreting tube fails to discharge its epithelial growth.

2. Similar fibrinous cylinders imbedding in their interior cells of such epithelium, natural, fatty, or puriform, as the tubes produce.

These cell-casts are hardly ever absent from the commencement of the renal catarrh. Their frequency lessens as the disease continues, though they are sometimes seen even in the latest stages.

3. Casts containing disintegrated epithelium irregularly mingled with the fibrinous basis. These are more or less dense, according to the proportions in which their elements

are mingled. They have a finely granular or powdery aspect.

These are really of the same materials as the preceding, differing only in the disintegration of the cells. The state of epithelium which they indicate has already been fully discussed. They may appear in almost any stage of the disease, since all that is required for their production is that the epithelial cells be retained in the duct long enough to lose their form.

4. When blood is passing from the Malpighian tufts the casts already described are diversified with entire blood discs; or the cylinders have a rusty brown colour, and coarsely granular appearance, showing nothing in their interior but disintegrated or compacted corpuscles.

These lend no further aid to the diagnosis than by certifying that the smoky tint of the urine is due to blood poured out by the kidney.

In many cases of the disorder all the variety of casts here mentioned may be found, either at the same time, or in quick succession. None of them are absolutely pathognomic of the disease, rare though it be to find either the uniform cylinders (1), or the cell-casts (2), when the kidney is in a state of granular degeneration.

GRANULAR DEGENERATION.

This disorder, the result, as has been already shown, of gradual changes originating in the intertubular tissues of the kidney, creeps on, insidiously invading first the outer surface, working its way inwards, and gradually involving and rendering useless one part of the gland after another, until what remains of the organ is insufficient for the wants of the system. Whether the primary alteration of tissue, which is the starting point of the disorder, is as it appears to be, one of those obscure changes of nutrition known as chronic inflammation, or whether the alteration is better described as degenerative, is of little consequence; the

effect is equally irremediable. It appears to be the result of some hereditary or acquired constitutional vice which gains ascendancy with advancing years. The symptoms are due not to the presence of any active process which admits of control by remedial means, but to the actual destruction of certain portions of the organ, and the necessary impairment of much that remains. Not only are large portions of the secreting tubes destroyed, but, as I have shown in a former paper, the large blood-vessels of the gland are of greatly diminished capacity, and the capillary system is rendered impermeable even to a disproportionate extent. Such alterations in the structure of the organ are, almost necessarily, of slow development, and as they proceed the system becomes accustomed to the deficiency. The gradual change from health to infirmity, and the very tardy appearance of any obvious manifestations of renal disease, correspond to the slowly increasing incapacity of the gland.

This disorder is scarcely ever attributed, even by the sufferer, to any external cause. In thirty-one cases, proved after death to have had this form of disease, the illness was not traced to any definite origin in a single instance; strongly contrasting in this respect with what is observed in the other form of disease.

The patient first seeks advice, it may be, in consequence of some œdematous swelling. It may appear, on inquiry, that for months past he has noticed some fulness or swelling of the ankles on going to bed, that for a long time before the urine had been pale and copious, and had been passed with frequency, especially during the night. It may, perhaps, have been noticed by the patient's friends that his complexion was becoming sallow and his features sharp.

The indefinite nature of its accession makes it difficult to limit the duration of the disorder with anything like the same certainty as we can limit that of the tubular disease. In twenty-one only of my cases was it possible to fix with any accuracy the advent of the first symptoms. One ended fatally in four weeks, this *appeared* the most acute; eight more at different periods before the end of the first year;

the remaining twelve going on for a longer or shorter time, up to ten years. It is impossible to say, from these data, how long the disease may last, or in how short a time it may cause the death of the patient. The contrast, however, is sufficiently marked between it and the tubular disease, which generally proves fatal within six months.

The dropsical effusion is often absent for a long time, sometimes altogether. It is rather incidental to the disorder, than, as in the other case, essentially characteristic of it. Of thirty-three fatal cases, no less than twelve were, as far as could be ascertained, without dropsical effusion at any period of the disease; and in only eight had this symptom attained any considerable extent. It is seldom or never found to accompany the earlier stages of the disorder when the urine is unnaturally profuse. The patients, therefore, are widely different in appearance from the victims of chronic nephritis; the bloated aspect and ivory pallor peculiar to the latter disease, contrasting with the withered appearance and sharpened features of granular degeneration, though there may be a little puffiness under the eyes, and a muddy or buff-coloured skin. Possibly the dark hue of the face may be owing to the deficient elimination of colouring matter in the urine.

With regard to the proneness to inflammatory attacks, the comparative rarity of peritonitis, pleurisy, and pneumonia is counterbalanced, as already pointed out, by a greater liability to bronchitis, which is much more frequent than the post-mortem records show. Pericarditis appears to be more impartial, frequently occurring in conjunction with the disease under consideration.

In the earlier part of the paper I adverted to the unusual occurrence of diarrhœa, as well as of lumbar pain. I also made mention of the increased frequency of micturition, which, indeed, often gives the first indication of organic change. I therefore need not dwell further upon these particulars.

The numbers in the table previously given, will suggest an inquiry as to the association of renal disorder with

valvular disease of the heart. A reference to Dr. Barclay's paper in the 'Transactions,' of this Society (vol. xxxi), will show, that taking death from all causes, valvular disease is present in 18·8 per cent. Now it appears from the calculations, of which the results are given (page 173), that in 43·2 per cent. of the cases of granular degeneration, there also exists a morbid state of the valves of the heart, which is more than double the standard proportion. Regarding the matter in another light, it appears from Dr. Barclay's statistics, that of seventy-nine cases of valvular disease, the kidneys were granular in twenty-nine, or in the ratio of 36·7 per cent.; while it results from the facts given at the beginning of this paper, that reckoning all the cases in the dead-house in ten years, granular degeneration of the kidney is present in the proportion of 10·6 per cent. only. The companionship of the two diseases is therefore more frequent than can be attributed to accidental concurrence, and must be held to show the existence of some bond of union between them.

With the smooth mottled kidney the connexion is less evident, though of course allowance must be made for the early age at which this disease proves fatal. The foregoing table gives 17·4 as the rate per cent. at which valvular disease accompanies this form of kidney, which is less than the standard proportion; while Dr. Barclay shows that in seventy-nine cases of valvular disease there were but five of the smooth, mottled kidney. This gives a proportion but slightly greater than holds with regard to all causes of death.

It therefore has to be settled which is the starting point in the series; whether the valvular disease of the heart engenders granular degeneration of the kidney or the converse. A full discussion of this question would occupy more space than can here be accorded, but it may be admitted that the venous congestion consequent upon cardiac derangement, though able to produce, as Dr. Jenner has shown, a certain hardening and toughening of the gland, involving intersticial fibrinous exudation, and ultimately a granular

surface, is by no means a frequent cause of renal disease. Independent disease of the kidney, on the other hand, with the deterioration of blood which ensues, increases the liability to atheroma, and also appears to be a frequent cause of inflammatory affections of the lining membrane and valves of the heart, as of the pericardium and other structures.

Dr. Bright discovered that renal disease was ordinarily accompanied by simple hypertrophy of the left ventricle, and suggested an explanation which has been further worked out by Dr. Johnson, and appears satisfactory. The blood, altered in character by the imperfect elimination of effete materials, requires more than ordinary force to drive it through the capillaries of the body. The hypertrophy of the heart, therefore, is a result of the increased demand for expulsive power. This adjustment is necessarily a work of time, and is therefore far more frequent with granular degeneration than with the more rapidly fatal disease.

Another development of the same chain of circumstances may be witnessed in the tendency to extravasation of blood within the cranium. Of 250 fatal cases of granular degeneration, seventeen were proved to have been thus affected. The proportion may not appear large, but it is necessary to take into account that granular degeneration of the kidney is one of the most common of the diseases to which flesh is heir, while sanguineous apoplexy is really one of the most infrequent. It is more fatal to the individual than formidable to the race. The period which afforded the 250 cases of granular kidneys, of which I have spoken, yielded but thirty-six of apoplexy. As this number seems too small to give a trustworthy result, I have taken into account a further period of ten years. From this it appears that during twenty years, seventy-five cases of sanguineous apoplexy have been subjected to examination in the dead-house of St. George's. Thirty-seven of these, or about half, had also decided renal disease. In thirty-one the kidneys were granular; in three large, smooth, and mottled; in three smooth and mottled also, but in the ultimate stage of con-

traction. We must infer from these data that disease of the kidneys promotes a tendency to rupture of the cerebral blood-vessels. This may be supposed to depend either upon increase of pressure on the inner surface of the arteries, or upon loss of tenacity in their walls; and there is reason to believe that both these conditions concur. There is evidence of the former in the constant occurrence of hypertrophy of the heart, as has been already shown; and of the latter, in the increased frequency of atheroma of the arteries in cases of granular kidneys. In a post-mortem examination, made as those I have quoted have been, with a view to general observation rather than to any especial object of research, nothing would be more likely to elude remark than atheroma of the blood-vessels, yet this condition was noted in more than half of the cases (52·4 per cent.) And of those seventeen who died by way of apoplexy, atheroma was noted in all but three.

Extravasation within the cranium, however, is not the most common of the head symptoms which occur in connexion with the granular kidney. Epileptic convulsions are incidental to this form of disease, though not so frequent as in the tubular disorder already described. But it appears to be characteristic of this variety of renal disease, as compared with chronic nephritis, that patients are very apt to pass gradually into a comatose state, without convulsions, the change being often preceded by dimness of sight, giddiness, peculiarity of manner, or delirium.

The urine is generally increased in quantity in this disorder. It is scanty only in the later stages. This affords a valuable means of diagnosis, as with the smooth kidney the exact contrary takes place. The comparative rarity of lithic acid, and especially of lithate of soda, as a deposit, necessarily follows upon the abundance of the urine. Beside this must be noted the deficiency of yellow colouring matter, rendering the secretion paler or whiter than the increase in quantity could account for, as well as the comparatively rare occurrence of hæmorrhage, which, it seems, never takes

place in the earlier periods of the disease. In thirty-three fatal cases where the particulars were carefully noted during life, this only happened four times to a sufficient extent to discolour the urine. The albumen is often in very minute quantity, and may even be absent altogether. As the organic change advances, it may appear in larger quantity, but even then is seldom enough to yield the bulky precipitates so generally seen with the other forms of disease.

The specific gravity, as might have been supposed, is much below the range of health, varying usually from 1008 to 1020, though sometimes transgressing these limits in both directions. The average of the cases under my own notice proves to be 1014.

Under the microscope a small quantity of renal epithelium, or a few pus cells, may sometimes be observed; so that this deposit cannot be regarded as diagnostic of either form of disease. The same may be said of the large granular spheres which are occasionally met with.

Casts appear with considerable constancy in the more advanced periods of the disease, though often when a trace of albumen has indicated its commencement, they are sought in vain. When present they are often characteristic. They may indeed, in a few cases, be of the uniform glassy appearance described in connexion with chronic nephritis, or they may even contain cells of epithelium as usual with that disorder, but such occurrences are exceptional. In the cases to which I have already referred, as under my own notice, there was not a single one where granular casts were absent, if casts were present at all. In the majority they were coarse, dense, and opaque, but if carefully looked into gave evidence of the intermixture of materials—disintegrated epithelium and clear fibrine—already described as their components. These casts, if found in abundant pale urine of low specific gravity, will afford an indication of granular disease of the kidney, which will seldom point wrong.

Summary.

The following conclusions may be deduced from what has been brought forward.

The smooth mottled kidney is the result of chronic nephritis. This disease may befall any person, the youthful being the most susceptible. It results from cold, from scarlatina, or some similar cause of renal hyperæmia. It begins with marked symptoms, and usually terminates under a year. It is often temporary in its nature, or amenable to treatment.

The granular kidney is the result of a degeneration which is peculiarly apt to take place in gouty or tuberculous persons. It is never seen except in adults, and is most frequent after the age of forty. It commences gradually, and is quite indefinite in its duration. This state of organ is necessarily irreparable.

Chronic nephritis is characterised by dropsical effusion; a great liability to inflammatory attacks affecting the serous membranes and the lungs; diarrhœa, especially in the later stages; pain in the loins, and finally coma preceded by epileptic convulsions. The urine is scanty, often bloody, the albumen abundant, and the specific gravity comparatively high. Casts imbedding entire epithelial cells are characteristic of the disorder.

Granular degeneration is to be recognised by a gradual failure of health, with sharpening of the features, and discoloration of the skin; while dropsy is often absent or of small extent. Frequency of micturition is observed, especially at night, and there is great liability to bronchitis. There is also a tendency to valvular disease of the heart, as well as to extravasation of blood within the cranium. Epileptic convulsions sometimes occur, but a fatal state of semi-coma often comes on without any such antecedent. The urine is increased in quantity except in the later stages, of low specific gravity, and often containing only a trace of

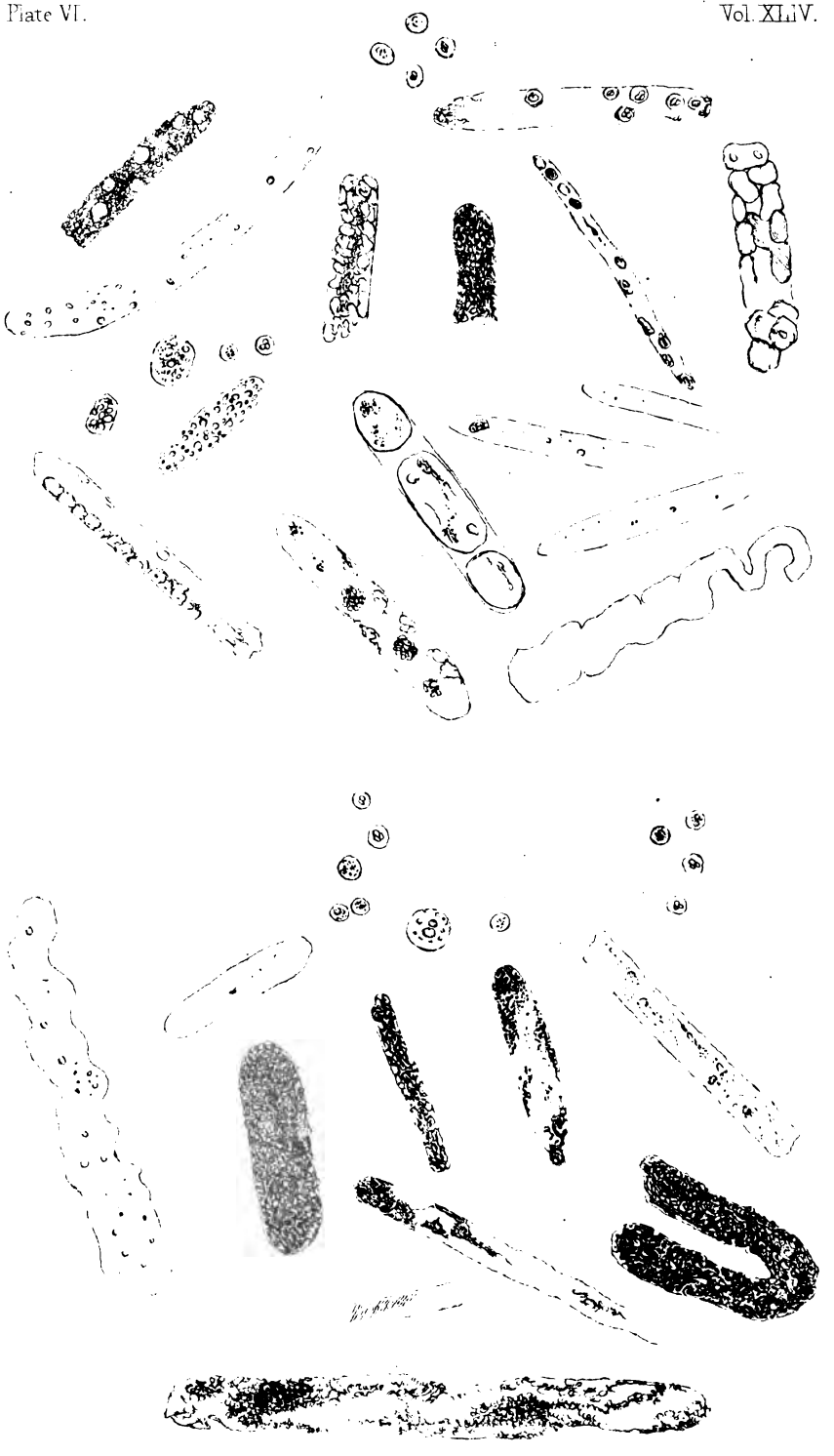
albumen. The casts most commonly found are of coarse, granular texture.

POSTSCRIPT.—One of the most conclusive arguments for the independence of the smooth mottled, and the granular kidney, one which should have been more emphatically dwelt upon in the paper, may be found in tracing the results of scarlatina. That disease is familiar to everybody as giving rise to the large white kidney; whereas the author has never seen, nor has he ever heard or read of, a case of granular degeneration which could be fairly traced to this cause.

DESCRIPTION OF PLATE VI, VOL. XLIV.

The group at the upper half of the plate represents epithelial and other casts, with loose cells of renal epithelium, observed in the urine of patients proved by post-mortem examination to have suffered from chronic nephritis.

On the lower part of the page are seen the granular and hyaline casts, with various forms of epithelial cells, afforded by patients ascertained to have been affected with granular degeneration of the kidney.



W.H.Dickinson del. G.H.Ford W.West imp.

ON A

CASE OF ANEURISMAL VARIX

IN THE

UPPER PART OF THE THIGH,

FOLLOWING THE EMPLOYMENT OF PRESSURE FOR THE CURE OF AN ANEURISM OF THE POSTERIOR TIBIAL ARTERY.

BY

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For a long time the occurrence of aneurismal varix and varicose aneurism, the two characteristic varieties of arterio-venous communications, was attributed to a wound of the contiguous coats of an artery and vein by a penetrating instrument.

Mr. Syme[1] was the first to place on record a case in which a spontaneous communication was formed between the abdominal aorta at its bifurcation and the vena cava, and a few years later Mr. J. G. Perry[2] published, in the 'Transactions' of this Society, an account of a patient in whom a similar condition existed between the femoral artery and vein, and gave rise to so remarkable a series of phenomena that the nature of the malady was suggested during life.

[1] 'Edinb. Med. and Surg. Journal,' vol. xxxvi, p. 34.

[2] 'Med.-Chir. Trans.,' vol. xx, p. 31.

Afterwards the researches of Mr. Thurnam,[1] in reference particularly to spontaneous varicose aneurisms of the aorta, established the fact of their not unfrequently originating between the great vessels of the chest and abdomen, and wholly independently of external violence. Thus the spontaneous origin of arterio-venous communications between some of the great vessels could no longer be doubted, but the cases in which such a commencement could be attributed to aneurisms of this kind in the extremities remained altogether exceptional.

The communication supposed to exist between the common carotid and jugular vein in the case recorded by Dr. Laurie,[2] was entirely of a conjectural character, the patient being still alive when the description was published. No cause was assignable for the commencement of the disease, but the symptoms, which were of long duration, were certainly very characteristic of it.

The same uncertainty attends the case of large popliteal aneurism referred to by Mr. Porter,[3] in which he hazarded the question, as to whether the aneurism had not burst into the popliteal vein; the symptoms generally, however, and the intimate connexion of the vein with the artery, justify the conclusion that such an accident had occurred.

In Mr. Adams'[4] case a true fusiform aneurism of the common iliac artery communicated with the common iliac vein. Little is recorded of the history and symptoms of this patient, and nothing whatever as to the probable cause of the disease; nevertheless, it appears to be a well-marked instance of spontaneous varicose aneurism.

With whatever frequency, then, it is admitted that spontaneous arterio-venous communications take place between the various parts of the aorta and the contiguous venæ cavæ, and between the aorta and pulmonary artery, the

[1] 'Med.-Chir. Trans.,' vol. xxiii, p. 323.

[2] 'Med. Gaz.,' vol. xxxi, p. 107.

[3] "Arteries, Pathological Conditions of." 'Cycl. Anat. Physiol.,' vol. i, p. 242.

[4] 'Dub. Journ. of Med. Science,' vol. xviii, first series, p. 166.

cases in which similar conditions have been defined during life, and dissected after death, between contiguous arteries and veins in the extremities, are shown by the instances I am able to cite to be of the utmost rarity.

Their origin, moreover, has hitherto been attributed to but one cause, that of an aneurism encroaching on a contiguous vein, and effecting a permanent communication by pressure and the absorption of its coats.

When, nearly twenty years since, the treatment of aneurism by compression was revived, and subsequently established by the Dublin surgeons, the possibility of long-continued pressure exciting mischief in some cases between the contiguous artery and vein, was not lost sight of by those who were little inclined to abandon the ligature in favour of the new system.

In his summary of the material points bearing on this method of treatment, Dr. Bellingham[1] thus authoritatively writes: "The femoral artery remains pervious after the cure at the point at which the pressure has been applied, *and no morbid change of any kind is to be detected in either the artery or vein at the site of the compression.*"

Mr. Tufnell[2] is also of opinion that the artery and the vein suffer no injury in consequence of the long-continued use of pressure; and in proof he adduces the histories of four cases where an opportunity for examination was afforded.

In one case the patient died forty-eight hours after the consolidation of a large popliteal aneurism, very slight compression having been used for twenty days. "There was some slight thickening of the cellular tissue surrounding the vessel at the situation where pressure had been made, but no change whatever in the vessel itself."

In a second instance,[3] also a popliteal aneurism, com-

[1] 'Observations on Aneurism and its Treatment by Compression,' Lond., 1848, p. 181.

[2] 'Practical Remarks on the Treatment of Aneurism by Compression,' Dublin, 1851, p. 97.

[3] Op. cit., p. 143.

pression was continued for nearly six months; it had the effect of curing the local disease, but the patient died a few days afterwards of phthisis. "Upon closely inspecting the points at which this long-continued pressure had been maintained, the femoral artery was found unaltered in its coats, and its calibre was not encroached upon. The femoral vein was quite flaccid, and its coats nowise thickened, but its connexion with the femoral artery was more intimate than in the normal condition of the parts, and this condition was uniform throughout the entire course from Poupart's ligament."

In the other cases where a dissection was made, no morbid changes whatever were found in either artery or vein; the compression had been used in the one example for many months, and in the other for six days.

Broca[1] collected the details of seventeen cases of circumscribed aneurism, including those already referred to, in which an opportunity was afforded of examining the artery in the part at which the pad had been applied upon it.

In one of these, a case of popliteal aneurism, in which pressure had been used for five months, the artery and the vein were perfectly healthy at the point of compression, but the surrounding cellular tissue was a little more than ordinarily dense (p. 750).

In another, an inguinal aneurism, the pressure had been uninterruptedly made at the pubic arch for the last five years of the patient's life; the artery was found contracted and its walls thickened (p. 749).

A third instance was one in which a large diffused aneurism of the posterior tibial trunk was treated by compression for twenty days; the artery and the vein were found more adherent to each other than on the opposite side (p. 764).

In a case[2] of popliteal aneurism, where pressure had been applied for five months, the artery and the femoral vein

[1] 'Des Aneurysmes et de leur traitement,' par Paul Broca, Paris, 1856, p. 746.

[2] 'Dub. Med. Press,' 1851, vol. xxv p. 197.

were perfectly healthy at the point of compression, but the surrounding cellular tissue was a little denser than ordinary.

Beyond these, no changes in the vessels near the points of pressure were observed in the remainder of the cases that were submitted to dissection.

Now, a consideration of these facts leads us to the conclusion that the effect of even long-continued pressure on the arterial coats is not to alter them in any material degree, or to produce any serious morbid changes in the contiguous veins. That certain disastrous results have ensued cannot, however, admit of dispute; such as the production of eschars and sloughing, leading to hæmorrhage[1]— events which have usually happened within short periods after the commencement of pressure, and have led to its abandonment, and to the use of the ligature. Such occurrences have been few in number, and have not affected the general estimation of the advantages of compression, though it must be confessed that far less success appears to have attended its practice in Great Britain than in Ireland.

The case which I shall now proceed to narrate will not affect the value of compression when applied for the cure of aneurism generally, but it will, I venture to think, illustrate a complication hitherto without a parallel in the results of that mode of treatment, and which has originated in consequence of its long-continued use.

Case.—Michael C—, a native of Ireland, æt. 50, a spare, sallow, weather-beaten pensioner, was admitted under my care into the General Hospital, Birmingham, on the 16th of April, 1857, having a swelling in the upper part of the calf of the right leg.

At a very early age he had entered the army, and at twenty-one had left England for India, in which country and Australia he had remained nineteen years.

His health, both abroad, and at home had always been excellent, so much so that he had never suffered from any

[1] Roux, 'Nouveaux Eléments de Med. Opératoire,' Paris, 1813, tome i, p. 717.

other disease than syphilis, which he contracted twenty years since. This disease had required the free use of mercury for its cure.

During his residence abroad he always lived freely, whisky and beer being his chief drinks; but, as was testified by his soldier's character, he was neither habitually drunken nor dissipated in his habits. After leaving the army he was variously employed as a labourer in the country, and latterly had pursued a trying and laborious occupation in a brick-yard. So far as he knew the history of his family, its members had been long lived and healthy.

About ten weeks ago, whilst walking, he suddenly experienced a sense of stiffness in the calf of the right leg. This symptom kept on increasing for the next fortnight, when he, for the first time, perceived a swelling, and soon afterwards he experienced severe pain in its seat. The growth of the swelling, though gradual, was marked for the next eight weeks; but the pain abated, as he kept closely to his bed.

On examination, a hard, ill-defined tumour was felt in the upper and back part of the right leg, apparently deeply seated behind the gastrocnemius and soleus muscles. It projected slightly on either side, and corresponded by its upper margin to the position of the lower border of the popliteus muscle. There was slight but distinct pulsation in it, unaccompanied by any bruit. The integuments were neither adherent nor discoloured, but they were very tender to the touch. The circumference of the limb at the most prominent part exceeded by an inch and a half that of the sound one. The anterior tibial artery was large and prominent, pulsating strongly on the dorsum of the foot; but the posterior tibial was scarcely to be felt in its course behind the inner malleolus. Both femorals were large, and the arteries generally were hard and cord-like. On auscultation of the heart, both mitral and aortic bruits were heard. Pressure applied to the femoral artery completely stopped the pulsation of the tumour.

In a month's time the pulsation had become much stronger, and a distinct bruit was audible over the inner side of the tumour, close to the edge of the tibia, but not over the outer and posterior surfaces. Pulsation and bruit ceased when the femoral was controlled.

The patient was carefully examined by my colleagues, and they arrived at the same conclusion as myself, that the disease was an aneurism of the first part of the posterior tibial artery, immediately below the bifurcation of the popliteal.

Having satisfied myself on this point, I next took into consideration the question of treatment; and the evidences of cardiac and general arterial disease appeared to me so strong that, with but little hesitation, I decided on adopting the plan of indirect compression, in preference to placing a ligature on the femoral artery.

May 17th.—Compression was commenced by means of a clamp tourniquet, which was applied to the femoral artery immediately below Poupart's ligament. It had the effect of at once greatly diminishing the circulation through the aneurism, but it did not entirely arrest its pulsation. In consequence of the irritability of the patient and his intolerance of pain, the pressure could only be borne for an hour or an hour and a half at a time during the first five days.

On the 22d the point of pressure was changed to the pubes. This altogether stopped the pulsation in the tumour, but the want of courage on the part of the patient prevented its continuous application.

After a few days, however, the excessive irritability having in some measure abated, a sum-total of eight, nine, or ten hours' compression out of each twenty-four was obtained, and kept up daily.

For about three weeks this plan of treatment was maintained; he could then, he said, bear it no longer. The artery was therefore controlled by one of Weiss' instruments, the upper pad being applied at a point between Poupart's ligament and the entrance of the saphenous into

the femoral vein, whilst the lower one was occasionally fixed on the vessel in the middle third of the thigh. This latter situation proved by no means suitable, as the instrument constantly slipped; and after a short period of trial it had to be altogether abandoned in favour of the first-mentioned spot, where the pressure was continued throughout the entire period of the subsequent treatment.

June 20th.—The aneurismal tumour was carefully examined at this date, after the lapse of thirty-four days from the commencement of the pressure. Its bulk had not changed, nor did it appear harder. The pain in it had alone diminished; for the bruit was louder and audible over a larger surface than formerly, and the pulsation was as marked as ever. Arrangements were now made with the view of keeping up the pressure uninterruptedly for forty-eight or more consecutive hours.

Relays of dressers cheerfully undertook to watch, and to prevent the interference of the patient in the absence of continued surveillance. Accordingly the vigilance commenced on the afternoon of the 22d, and for seven hours no pulsation was detected in the aneurism. He then declared that nothing should induce him to submit longer, and this project was reluctantly given up.

After this, pressure was applied for about three hours in the morning, three in the afternoon, and three again in the evening. He submitted to this amount with tolerable resignation. The aneurism itself was now also subjected to pressure by means of firm bands of adhesive plaister and a roller.

July 25th.—Pulsation somewhat less, bruit decidedly so; the patient's general health very much improved.

August 23d.—The bruit had disappeared, otherwise there was little change in the aneurism. In addition to the roller and adhesive plaister, a firm graduated compress of lint was applied over the tumour. The pressure on the femoral was now fairly borne, and was applied on an average twelve hours out of each twenty-four.

October 21st.—No bruit; pulsation less. Aneurism

smaller and softer; pressure on both artery and aneurism still continued.

February 6th, 1858.—The tumour not so large by half; pulsation scarcely perceptible. Pressure has been perseveringly kept up.

March 3d.—The aneurism can scarcely be felt, and the pulsation has very nearly ceased. The patient is now up and about, and only lies down a few hours during the day to apply the pressure.

April 23d.—He was made an out-patient, after having been in the hospital twelve months. At this time the aneurismal tumour had altogether disappeared, a limited hardness, perceptible through the thin muscles of the calf, alone marking its position. In health the patient was much improved, notwithstanding the long continuance of pressure. During nine months, pressure had been applied more or less continuously on one spot, yet there had been no inflammation of the adjacent parts, no enlargement of the neighbouring glands, and indeed no alteration in the extremity generally, or in the textures immediately beneath the pad, save perhaps that they were somewhat thickened and œdematous.

During the next ten months he occasionally showed himself to me at the hospital. He enjoyed good health, had no remaining trace of the aneurism, and was able to get his living by selling small wares about the town.

February 14th, 1859.—Michael came to me to-day in much suffering. His right leg was swollen and painful, and he could no longer keep up; he looked sallow and cachectic, and begged to be admitted into the hospital.

He tells me that, when he was discharged, he resumed his occupation as a hawker, travelling long distances daily. This he did without feeling any pain or inconvenience beyond a slight swelling of the foot at night. About a fortnight since, he felt some pain in the right groin, but having a cold he thought it proceeded from that, and took no further notice of it, until his foot and leg became so much swollen that he was unable to put his boot on. The pain

then became more severe, and, on examining his groin, he, for the first time, perceived a swelling.

On examination, he presents a pulsating enlargement in the right inguinal region, which appears to depend on a dilated condition of the external iliac and femoral arteries. It becomes gradually lost at the bifurcation of the common iliac above, and extends from two to three inches along the femoral below. The greatest prominence, not however amounting to a distinct tumour, is on the inner side of the femoral, as nearly as possible in the situation where the pressure had been for so long a period applied in the treatment of the previous aneurism. The pulsation is here very evident to the eye. It is forcible, throbbing, and expansive. A distinct vibratory thrill can be felt as high as the bifurcation of the aorta, and as far downwards as the junction of the middle and lower thirds of the thigh, whilst a harsh, loud, rushing bruit is heard over the part.

The opposite femoral feels hard and cord-like, and a distinct bruit is audible as it passes over the pubes. The arteries generally are marked in outline and inelastic. The aortic and mitral bruits are much the same as when he was in the hospital before.

The limb generally is swollen, and the superficial veins so much enlarged that great difficulty is experienced in ascertaining to this extent the state of the vessels. With a view, therefore, to a more careful investigation, a bladder of ice was applied to the region of the swelling, at the same time that the limb was carefully raised and covered with evaporating lotions.

February 26th.—The limb much smaller; the swelling is only moderate in degree, being confined to the foot and leg. On examining the femoral artery at the seat of pressure, a distinct lateral enlargement is discovered on the inner side, about as large as a pigeon's egg. The hand placed on this experiences the sensation of a vibrating motion or thrill being produced from within. This thrill is continuous, and most intense over the centre of the enlarge-

ment; it diminishes in degree as the hand is passed upwards or downwards in the course of the artery.

On using the stethoscope, the character of the bruit is more clearly defined than previously. It constitutes the loudest bruit that can be imagined; so harsh is it that it becomes acutely disagreeable to retain the stethoscope for more than a few moments. To my ear it conveys sounds like those which are peculiar to the ceaseless rushing movements of the steam forge-hammer. This bruit is also audible along the vessels above and below the spot where it appears to originate, its vehemence lessening with the increase of distance, until it entirely disappears. The veins are principally enlarged at the upper part of the thigh, more especially the internal saphenous, the superficial circumflex iliac, the superficial external pudic, and the epigastric. Some of these are as large as goose-quills, and very tortuous. Below, the veins are less prominent; but the skin is discoloured, and the tissues of the leg and foot are œdematous. He complains of a good deal of pain about the groin, but this has abated in a considerable degree since his readmission.

During the next few months, the treatment by cold to the swelling and a suitable position of the extremity was carefully maintained. The disease was minutely examined by my colleagues at the hospital, as well as by numerous members of the profession in Birmingham and its neighbourhood, and amongst those who thus gave me the advantage of their opinions on the case were Mr. Hodgson and Professor Syme.

I believe I am correct when I state that no doubt was entertained by any one as to there being a communication between the femoral artery and the femoral vein, near the point where the pressure had been applied in the cure of the first aneurism.

As an operation was out of the question, my object in the subsequent treatment was to afford my patient as much comfort as possible, consistently with retarding the progress of this most serious and painful complication.

Hitherto, in order to promote his cheerfulness and vary his monotomy, I had permitted him to go outside his ward daily for half an hour to smoke, and the indulgence did not appear to act prejudicially to the leg. In September, however, about seven months after admission, the extremity having been gradually becoming more livid in aspect from the pelvis to the foot, and the veins of the surface more enlarged and tortuous, he noticed one morning that his thigh was far more swollen than it had ever previously been. In colour the inner and anterior parts of the limb were intensely red, whilst a doughy feel was conveyed to the fingers, accompanied by deep pitting and by pain. Owing to the swelling, the intensity of both thrill and bruit were considerably diminished. This sudden increase in the dimensions of the part attained a maximum that was indicated by an excess of eight inches in the measurement of the circumference of the upper third, and of seven inches at the middle and lower thirds, of the affected thigh in comparison with its fellow. Towards the end of October the redness and swelling had considerably diminished. In December the integuments in the leg gave way, and three large sores with deep sloughs formed, and menaced rapid extension, whilst the œdema and discoloration returned, especially below the knee. The tortuous veins were not now so perceptible in the leg and foot, owing to the dense condition of the cellular membrane; but they were still prominent on the outer and anterior aspects of the thigh, as far as the crest of the ilium.

For the first time since his admission, his health began to fail, and emaciation from the pain and suffering seemed to threaten an early termination of his life.

He was now allowed a most generous diet, with abundance of wine, and the extremity was raised, without intermission, above the rest of the body. Towards February, 1860, the sloughs separated without hæmorrhage, and granulations sprang up; the general health also regained its lost vigour so effectually that at the end of March no sores remained unhealed. Meanwhile the aneurismal phenomena

continued. There was no check to the *frémissement*. It could be easily felt just above the inner side of the knee, and as high as the bifurcation of the aorta; still less was there any abatement in the bruit, always so harshly rushing and grating, whenever the ear was applied to listen to it, and which now appeared to have attained an intensity beyond my power to describe.

After this improvement in his general health, I noticed in the month of May that the scrotum was filled with water; there was also some effusion into the peritoneum. With this and a more embarrassed action of his heart, he had at times great difficulty of breathing, aggravated by the necessity of keeping the lower parts of his body in the raised position. These signs of organic complication did not yield in any material degree, and, though the patient remained wonderfully well and cheerful, it was evident that but a little fresh impediment was wanted to terminate life at any moment.

In the morning of October 8th, after having throughout the previous day expressed himself as feeling better than usual, he was seized, whilst turning in bed, with difficult breathing, and died in a few minutes.

The dissection was made in the afternoon of the day on which he died. The body was much emaciated, the peritoneal cavity swollen and distended, and the right leg of great size and hardness, as compared with its fellow.

Thorax.—The lungs were gorged with blood, especially at their posterior portions, where was also a great absence of crepitation; otherwise their structure was healthy. There was slight effusion into the cavities of the pleuræ. The heart was greatly enlarged, measuring five and a half inches in the broadest part of its transverse diameter; the ventricular walls were much thickened, especially on the left side, where they were upwards of an inch thick. The tricuspid and pulmonary valves were healthy; the mitral were thickened. The aorta was dilated, measuring four inches in circumference; its valves were thickened and insufficient; the

inner and middle coats adhered together, and were occupied by irregularly scattered atheromatous deposits; in some places scales of calcareous deposit existed on the inner surface.

Abdomen.—There was an abundant effusion of serum, without any appearances of inflammatory action, in the cavity of the peritoneum. The liver was small and cirrhosed. The kidneys were healthy.

Head.—The cerebral arteries here and there showed traces of calcareous deposits. The brain was healthy.

The arteries, the arterio-venous disease, and the old aneurism.—The dissection was here attended with no ordinary difficulties, owing to the altered character of the tissues, and to the solid and œdematous condition of the cellular membrane of the extremity. The muscles were exceedingly pale and wasted, and were in some parts hardly capable of recognition.

The aorta was of the ordinary size, but thickened by atheromatous deposit. The right common iliac was larger than the left, and had a large scale of calcareous matter on its posterior wall. The right external iliac was dilated, twisted, and tortuous; and it formed a marked contrast in these respects to its fellow, which passed to Poupart's ligament in the ordinary manner. Immediately below the origin of the circumflex iliac branch, the artery commenced to dilate considerably, and, as it passed to become femoral, it expanded and appeared to be intimately attached to the outer surface of a circumscribed tumour which was yet more intimately connected to the femoral vein.

This tumour was placed obliquely, its long axis being directed inwards and downwards. Its position and dimensions corresponded somewhat accurately with the situation and size of the saphenous opening in the fascia lata of the thigh, and it was formed at the junction of the long saphenous, one or more deep veins accompanying the internal circumflex or profunda arteries, and the femoral vein. It was two inches and one eighth in length, one inch and a quarter at its widest part in breadth, and about an inch in measurement from before backwards. When viewed in front, it appeared to consist of two rounded portions, separated by an oblique

line, one being inferior and internal to the other: posteriorly, this division was not so evident. The internal and inferior of these divisions, which was also the smaller, consisted of the expanded portion of the vein; the external and superior, of a varicose pouch which overlapped, and was attached to a considerable extent of the anterior aspect of the femoral artery.

Viewed internally, by means of an incision made along its inner border, and extending upwards into the femoral vein, the cavity or sac was seen to communicate by an oval, well-defined opening with the femoral artery. The opening in the artery was nine lines in length, by nearly six lines in breadth. The edges of the aperture were rounded and smooth. The wall of the artery was irregular, being marked with depressions and some small patches of atheroma. The profunda branch was given off just below the opening by a trunk common to it and the external circumflex. The anterior wall of the sac was thinner than the posterior, and was altered in places by commencing atheromatous deposit. Posteriorly and below, it was thicker, and had elevations projecting into it; here also it was affected by atheroma, and some few calcareous scales were visible. It was further marked by a projecting ridge, corresponding to the oblique line separating the two portions described on the external view. This ridge had a rounded edge; it was most distinct in front and below; above, it was continuous with a septum that divided for a short distance the upper part of the femoral vein from the sac; and behind it became lost on the posterior wall of the general cavity. The portion of the cavity internal to this ridge corresponded in shape and position with the inner and inferior rounded portion seen externally: at its lower part atheromatous matter was scattered in patches. The femoral vein opened into it above, and at its posterior and inner part, and close to the ridge, was the opening of the lower portion of the same vessel, entering it obliquely, and having the internal circumflex veins joining it at its point of entrance. The internal saphenous vein opened into one of the depressions noticed at the lower and back part. The second and outer portion of the cavity intervened between

the ridge previously described and the opening in the femoral artery. Thus the artery and the vein appear to be united together behind, both being dilated, especially the latter; whilst, in front, the expanded coats of the vein formed a sac or pouch, which extended over the artery, and was inseparably attached to its outer surface.

The femoral artery, below the seat of communication, and where it is usually tied, was of the natural size, but its coats were thickened in two places by slight patches of atheromatous deposit.

The seat of the old aneurism was the first part of the posterior tibial artery, immediately below the point at which the popliteal divides. The tumour forming the remains of the sac rested against the posterior surface of the fibula, to which it was firmly united, and which constituted its anterior and outer wall. At its inner side, behind, lay the internal popliteal nerve, flattened above, and running below in a groove of the aneurism. Internally to this and in front ran the posterior tibial vein, lying close to the artery. The latter, though irregular and dilated, was still distinct in its outline, and its anterior aspect appeared to have been the part more immediately involved in the disease. The popliteal artery passed, dilated and pervious, into the anterior tibial, which was also greatly enlarged, and perforated the inter-osseous membrane on a level with the upper margin of the sac. The continued trunk of the posterior tibial, where it issued from the lower part of the sac, was reduced to a mere cord, and was filled by solid fibrinous and calcareous deposits as far as the ankle. The sac was thin, especially behind, and was filled with old and very dark-coloured fibrinous coagula. It measured rather more than two inches in length, and exceeded an inch in width and thickness.

Reflection on the foregoing case suggests an inquiry as to the exact character of the disease involving the artery and vein, the period when it was produced, its probable cause, and the mode in which this cause acted in effecting the morbid changes.

The disease appears to me to be of the kind known under the name of aneurismal varix, a reference to the preparation or drawings showing at once that the opening in the artery communicates directly with the cavity of the dilated vein. No aneurismal sac is formed by the artery, this vessel being merely dilated at and above the opening in its wall.

The coats of the vein are dilated into a varix or pouch, which envelopes the artery, leaving the tube of the latter free and distinct, except behind, where the tunics of both vessels are blended together.

The period when this occurred was ten months after the cure of the aneurism in the posterior tibial artery.

In tracing the cause of this disease, it must be borne in mind that the patient never experienced any injury to the part either by wound, contusion, or strain, prior to the employment of the pressure. These possible causes are therefore excluded.

Its spontaneous origin and its production as a result of the long-continued pressure applied to the femoral artery remain for consideration. The first can scarcely be entertained. So-called spontaneous arterio-venous communications occur as sequences to arterial aneurisms, which by absorption gradually make their way into the contiguous venous channels. Here we have simply an aneurismal dilatation of the vein.

But apart from this fact, we have the disease occurring within a few lines, either above or below, of the spot where the compressing pad was applied for upwards of nine months, in the cure of the aneurism of the posterior tibial artery.

Now, I have already stated that no alteration in the textures was observable on the pressure being discontinued, beyond a little thickening of the immediately subjacent parts; nor, at any time during the treatment, had any eschar formed, any disposition to phlebitis manifested itself, or enlargement of the neighbouring glands appeared.

It may therefore be said, that if injurious effects had been likely to arise from the compression, they would have shown

themselves whilst it was being employed, and not ten months after it had been discontinued. This conclusion is, indeed, maintained by Mr. Tufnell in a letter he was good enough to write to me on the subject of this case; though at the same time he felt that he could not deny the possibility of the artery having been influenced by so long an impression on its coats.

The very fact, however, that so long a time did elapse, appears to me to be most consistent with the experience we at present possess with reference to the character of the changes that long-continued pressure may produce on the artery, or the vein, on the intermediate or the surrounding parts. Amongst these, inflammation of the cellular tissue surrounding the vessels, hypertrophy of the sheath, adhesion of the artery to the vein by the deposit of lymph, and, I think I may venture to add, varix, may be enumerated as having been observed in the dissections that have been made.

Long ago, Freer,[1] in experimenting on the effects of arterial compression, when employed with sufficient force to excite inflammation of an artery in a healthy state, and of the parts surrounding it, was led to conclude that the effusion of lymph took place into the coats of the vessel, and not into its cavity. This fact, then, and the dissections I have alluded to, where no changes were found in the artery, warrant us in assuming that in a natural condition almost any extent of pressure in reference to duration may be used, short of producing inflammation, without injurious effects. But, on the other hand, will the exercise of such pressure on a diseased artery be attended with corresponding immunity?

In answer to this, it must, I think, be admitted that the tendency under such a condition must be to render the arterial tunics thinner, possibly more friable, and to produce a state favorable for dilatation.

Presuming, then, that the influence of the pressure on the artery and vein in the case before us did lead to their subsequent communication, it will now be desirable to inquire

[1] 'Observations on Aneurism,' p. 13, Birmingham, 1807.

as to the probable mode in which it was produced by such an agent.

At the commencement of the treatment by compression, the pad was applied for three weeks to the artery on the pubes, for eight, nine, and ten hours out of each twenty-four, and throughout the entire subsequent period of nine months to the vessel immediately below Poupart's ligament, at a point between this and the entrance of the saphenous vein as nearly as possible corresponding to the situation where we find the aneurismal varix developed at a later period.

In applying pressure to the femoral artery on the pubes, the vein cannot escape its influence. "In fact," says Dr. Bellingham,[1] "if we lay bare the artery and vein by dissecting away the front of the sheath, we will find that (even under these favorable circumstances) it would be impossible to apply the pad of an instrument here so as to compress the artery alone."

The return of the venous blood being thus impeded, a varicose condition of the veins below the point of pressure is likely to take place, and that it does occur in many instances from this cause there can be no question.

From the circumstance, moreover, of the chief veins of the lower extremity—the long saphenous and the deep veins accompanying the branches of the femoral artery—entering the femoral vein at the saphenous opening, this spot is likely to become the seat of varix.

In my judgment, then, the first effect of the pad applied on the pubes was to induce varix in the femoral vein; afterwards this condition was increased, as the point of pressure was changed so as to act on the varix itself, or on the part of the vein immediately above it.

In the many alterations rendered necessary by a tedious case, doubtless the patient not unfrequently applied the pad with some degree of inaccuracy, so as to produce a greater influence on the vein than might otherwise have been looked for.

However this may have been, as the pressure was kept

[1] Op. cit., p. 156.

up, the varix must, ere long, have approached the artery, having before it the septum of the femoral sheath and the coats of that vessel in a state of disease.

As a further result, an intimate adhesion between the artery and the vein became effected, and an expansion of the dilated coats of the latter over the former took place.

Afterwards, the influence of the blood on the thinned arterial wall from within, as well as of the pressure exercised by the varix from without, gradually diminished the obstacles to the communication, and at length terminated in its establishment.

In thus attributing a primary influence to the varix in determining the seat of the disease, I am guided by the appearances presented by the specimen; for I cannot conceive, that in the absence of an aneurismal sac, an arterio-venous communication of the kind that has been described can have arisen from causes originating in the artery alone; and in reviewing this portion of the case, surgical, no less than pathological, reasoning seems to justify the connecting its occurrence with the long-continued use of pressure.

DESCRIPTION OF PLATE VII.

1.—Anterior view of the arterio-venous communication of the femoral vessels, described in the foregoing paper.

A, A. Femoral artery.
B. B. Femoral vein.
C. Saphenous vein.
D. Profunda artery.
E. Varicose pouch, formed by the femoral vein.

2.—The arterio-venous communication: internal view.

A, A. Femoral artery.
B, B. Femoral vein.
C. Saphenous vein.
D. Profunda and external circumflex, arising by a common origin.

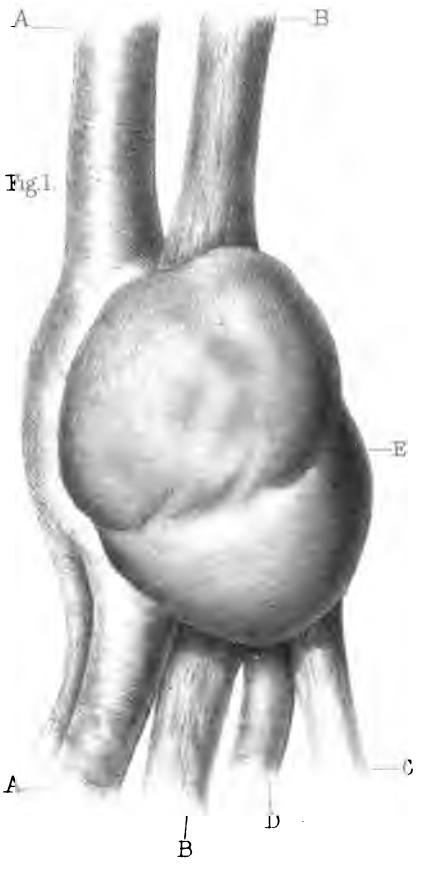

Fig. 1.

Fig. 2.

S. Moreton del. G.H. Ford. W. West, imp.

ON A

CASE OF AORTIC ANEURISM,

IN WHICH

A COMMUNICATION WITH THE PULMONARY ARTERY WAS RECOGNISED DURING LIFE BY MEANS OF PHYSICAL DIAGNOSIS.

BY

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COMMUNICATED BY

DR. MARKHAM.

Received May 1st.—Read June 11th, 1861.

The best memoir extant (Dr. Thurnam's) upon spontaneous varicose aneurisms of the aorta is contained in the 'Transactions' of this Society. To it, therefore, the present communication may be most suitably addressed, since my object is to render more precise the physical diagnosis of this disease.

James Selwood, æt. 35, married, a porter in the Parcels Office, at the New Street Railway Station, applied at the Birmingham General Dispensary, on May 1st, 1860. He was a fine-looking, well-made man, and complained of slight cough, some general debility, and a little loss of flesh. These symptoms had been coming on for several months. Suspecting phthisis, I stripped him to examine the lungs. Not finding any sign of disease in the anterior portions of these organs,

I applied the stethoscope to the heart, and directly heard sounds which convinced me that the case was not one of ordinary valvular disease. I therefore recommended the patient to enter the Queen's Hospital, under my care, which he did in a few days. I found that for four years he had suffered much from piles, and about November, 1859, had lost as much as a pint of blood in a day, and, ever since, the losses have been considerable. To these fluxes he attributed the debility and wasting which induced him to consult me. About Christmas, 1859, his duties, in calling over the parcels, &c., being at that time very onerous, he suffered for a day or two from hoarseness, and has since often felt a rising in the throat. Two weeks before I first saw him, whilst wheeling a heavy truck across the line, an engine ran up, and to avoid being knocked down, he was obliged to make a violent and sudden spring; he directly felt very faint, and was compelled to sit down for some time, but thought no more about it. He had never had any palpitation. His appetite was good, and he slept well. He had a little cough, with expectoration of watery mucus, and slight dyspnœa on exertion; but the cough was most troublesome on lying down.

Physical examination showed that the cardiac dulness was increased in the vertical direction. The apex could be distinctly seen and felt beating in the sixth intercostal space, and the heart was also to be seen beating in the fifth. Over the cartilage of the fourth left rib two loud murmurs were heard, instead of the usual cardiac sounds; that, with the second sound, being of a hissing character, and so prolonged as to continue till the commencement of the next ventricular systole. At this same spot a very considerable purring tremor accompanied the second murmur. The first murmur was of a loud bellows character. Both murmurs were audible as high as the bifurcation of the common carotids, in the back, and over all the upper part of the chest; they did not seem to be peculiarly propagated towards the left subclavicular space. At the apex of the heart a single murmur only was to be heard, and this evidently attended, or rather re-

placed, the cardiac first sound; it could be traced easily down to the ensiform cartilage. At the apex, the cardiac second sound was very distinct and quite natural; no trace of murmur.

I found no venous distension on pulse. The pulsation of the carotids was very visible, particularly on the left side and marked by some, though not considerable, thrill. The heart's action was quiet and regular.

The only abnormal physical sign in the lungs was some mucous râles at the base of each, equally on either side. Pupils contracted, but mobile; liver enlarged, no icterus; urine normal.

From this combination of physical signs, I concluded—

1st. That blood escaped either from the aorta or the pulmonary artery during their systole, from the loud hissing, prolonged murmur replacing the second sound at the base of the heart.

2nd. That it was probably from the aorta that the blood escaped, from the propagation of the sound up the arteries of the neck, and their visible pulsation and sensible thrill.

3rd. That the blood did not regurgitate into either ventricle, from the absence of any regurgitant murmur at the apex of the heart, where, on the contrary, an ordinary second sound was audible. It is true that slight regurgitant murmur is not necessarily conveyed to the apex of the heart; but I have never yet found it absent there, except when the murmur was very slight, whilst in this case the murmur was very loud and hissing at its point of origin.

4th. That the blood probably regurgitated into one of the auricles, or into the pulmonary artery.

5th. That it did not regurgitate into the left auricle; inasmuch as, had it done so, we should have found more decided pulmonary engorgement, and hæmoptysis rather than hæmorrhoids or hepatic enlargement.

6th. That the opening was rather into the pulmonary artery than into the right auricle; because aneurisms more frequently perforate the former. In eighteen cases of varicose

aneurism recorded by Dr. Thurnam, eleven had perforated the artery, and only seven other parts, even including cases of communication with the superior and inferior venæ cavæ. Of 29 cases collected by Dr. Sibson—

17	opened into the	pulmonary artery.
6	„	right auricle.
3	„	right ventricle.
3	„	left ventricle.
0	„	left auricle.
29		

In seven others the aneurism had opened into the vena cava descendans.

Further, the frémissement was to the left of the sternum, whereas in recorded cases of openings into the right auricle the frémissement presented its maximum intensity at the right of the sternum.

7th. That the communication was probably owing to aneurismal perforation of the aorta at or near its origin. Because there was no history of cyanosis to indicate any congenital malformation of the heart. The increased vertical dulness, age, formation, and occupation of the patient, as well as some points of his history, lent strength to this view.

8th. That the aneurism sprang from the root of the aorta, or near it.

To proceed now with the narration of the case.

No change took place in the physical signs during his residence in the hospital of about three weeks, except that after a considerable hæmorrhoidal loss the murmurs and frémissement all became intensified; they, however, soon reverted to their former condition.

At his urgent request that something should be done for the piles, I allowed Mr. Wilders, our able house-surgeon, to touch them with nitric acid. After this they bled less, though the hæmorrhage was never completely suppressed, nor indeed did I wish that it should be.

He declared that he was quite well, except that his breathing was a little short. I could not induce him to remain longer in the hospital, as he was determined to resume his employment, which he accordingly did.

Upon the morning of the 14th of June, 1860, having been at work all night, he was seized about 6 a.m. with præcordial oppression and faintness, such as he had never previously experienced. Nevertheless, after getting some brandy and lying down for a couple of hours, he was able to walk home, a distance of about a mile. After that he became rapidly worse, and was seen by Mr. Pemberton, to whom I am indebted for the further account of this case.

Mr. Pemberton says, "I found him with laborious breathing, and an intense expression of anxiety, referring his suffering to a load at the epigastrium. The hand placed over the chest in the cardiac region experienced a purring sensation, clearly and distinctly marked sounds. These were characterised by loud, continuous, double-rushing sounds audible all over the cardiac region, but more intensely so at the base of the heart and up the aorta. There was entire absence of superficial venous distension; hæmorrhage, continuous and arterial, from the hæmorrhoidal veins. The condition of the patient varied only in the occasional abatement of his feelings of oppression.

"*Treatment.*—Brandy, ether, and counter-irritation.

"He continued much the same until the morning of the 28th of June. I visited him about 11 a.m., and found him gasping for breath. He would suddenly jump out of bed on to the floor, throwing himself at full length, and exclaiming that he was dying. He was truly so, and having informed his wife that I did not think he could live many hours, I had gone downstairs, when I heard a cry, and returned to his room. I found him lying on the edge of the bed, partly on the floor, with his head downwards, and a copious effusion of blood from the rectum. I at once raised him on to the pillow, when he gave a feeble gasp or two and expired."

Post-mortem, twenty-four hours after death, at which, by the politeness of Mr. Pemberton, I was present.—We found congestion of both lungs, with serous effusion of no great amount in either pleura. Abundant serous effusion into the abdominal cavity. The liver much enlarged and congested. The kidneys healthy. A few ounces of serum in the pericardium. The heart enlarged, chiefly on the right side. We also discovered the aneurism; but as the specimen was subsequently examined with care by Dr. Bracey, I shall employ his description of it.

"The aneurism springs from the origin of the aorta, and projects forwards compressing the right ventricle and the commencement of the pulmonary artery. It would contain, when distended, a small hen's egg. It communicates with the aorta by a round opening, about seven lines in diameter, just above and between the right and left semilunar valves. It also communicates with the pulmonary artery by a vertical slit with regular margin and smooth, rounded edges, about three lines in extent; this is behind the posterior division of the pulmonary artery, in the corresponding sinus of Valsalva. Below this and to the right is another opening, leading into the right ventricle between and below the posterior and right valves; its margins are ragged and thin, greatest diameter (transverse) about four lines. There are a few small patches of atheroma in the aorta. Heart large; valves healthy."

I may add, that there was no coagulum in the aneurism. The edges of the slit in the right ventricle were not only ragged and thin, but also stained with blood, which was not the case with the other openings.

As to the sequence of the lesions in this patient, I suppose that the aneurism itself had existed for probably not less than six months at the time that I first saw him; for that length of time, at all events, he had been suffering from hæmorrhoids, due, it may be presumed, to the pressure of the tumour upon the pulmonary artery. Upon this supposition, we should date the communication with the pulmonary artery from the time that he made the violent effort to

escape being run over. I cannot doubt for a moment that the perforation of the right ventricle took place on the morning of the 14th of June.

The case is of interest as being, so far as my knowledge goes, the first in which such a lesion has been discovered during life by physical means.

It is of importance as establishing—at least I am disposed to think so—the rational diagnosis of similar lesions in future.

Granting the correctness of this belief, a great advance has been made in the diagnosis of varicose aneurisms in general, since, as before mentioned, this particular species is by far the most common of the whole class.

At the same time it must be borne in mind that the key to my opinion was the non-conduction of the second murmur to the heart's apex. We should therefore be at a loss in most cases where—

1st. aortic, or

2nd. pulmonary regurgitation existed;

3rd. In which the new communication produced no murmur with the second cardiac sound;

4th. Where there also existed an opening into either ventricle,

5th. or if there was an opening into the left auricle or its appendix. Though we should, I think, be saved from error by attention to the physical condition of the lungs, as compared with that of the liver, &c.; and besides, such a lesion is of the utmost rarity.

The case is both interesting and important, as showing with how little inconvenience such a lesion may exist.

Much stress has always been laid upon thrill as an indication of varicose aneurism; and this rightly, when the site of thrill is so remote from the heart as to preclude the possibility of a cardiac origin, but not otherwise, since there seems to be no limit to the amount of thrill producible by simple valvular lesions. In the present case the thrill was not employed to prove the existence of preternatural communication, though its presence lent a certain amount of strength to

that theory. It was employed, secondarily, to indicate the exact position of this communication; at the same time, even in its absence, the site of the second murmur would have given precisely as much as, and perhaps even more reliable information than the thrill itself, since it is by no means certain that thrill is invariably most intense at the site of the lesion upon which it depends. Neverthless, were such a thrill, to our own knowledge, *suddenly* developed over the heart, it would have almost as great semeiotic value as it undoubtedly has in varicose aneurisms remote from the heart.

Although I am perfectly content to rest the validity of any diagnosis in this case upon its own merits, yet the arguments upon which it was founded do gain weight from a case recorded by Professor Hughes Bennett, in his 'Principles and Practice of Medicine.' The physical signs, general history, and dissection, were nearly identical with those of my own patient. Dr. Bennett did not deduce from them any diagnosis during life; in fact, he says that there was "evidence of a profound lesion of the heart, although its nature was very mysterious, the more so as no thrill or tremor was detected. The case, however, was at once made clear, and the nature of the sounds explained, by the examination of the body after death." It is at the same time due to myself to state that I was not aware of the existence of Professor Bennett's record, until after the death of my patient.

ACCOUNT OF A CASE

IN WHICH THE

CORPUS CALLOSUM AND FORNIX WERE IMPERFECTLY FORMED,

AND THE

SEPTUM LUCIDUM AND COMMISSURA MOLLIS WERE ABSENT.

BY

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COMMUNICATED BY

T. B. CURLING, Esq., F.R.S.

Received May 3rd.—Read June 25th, 1861.

THE medical literature of examples of defective commissures of the brain comprises so few cases, and of these the life-history is so imperfect, that I need no apology in placing the records of another before the members of this Society. The question has often been proposed to me, what relation idiocy bears to these arrests of development. At an early stage of my inquiry into the pathology of idiocy, I was prepared to meet with many cases characterised by the heading of this paper, but on further investigation found that, with the exception of deficient commissura mollis, absence or defect of the larger commissures of the brain

occurred but seldom. Among fifty brains of idiots which I have dissected, the following is the only example of this nature.

That idiocy *frequently* depends on defective commissural connection my present experience does not support; but, on the other hand, that the absence of such connection may not *occasionally* be a cause of this calamity is, I apprehend, a question *sub judice*.

Mr. Paget, in the twenty-ninth volume of your 'Transactions,' has so ably generalised on the cases at that time on record, that there is little to be done beyond adding to the facts illustrating this interesting subject.

The case to which I beg leave to call your attention, is that of A. B—, a boy aged nine years at the time of his death. He had previously been under my daily observation for two and a half years. He was the first-born of three children; the second, a boy, is also idiotic; while the third and youngest, a girl, is healthy and intelligent. The respective ages of his father and mother, at the time of his birth, were twenty-six and twenty-seven years; there was no consanguinity between them. There is no history of mental disease, or of any such defects as club-foot, hare-lip, cleft palate, &c., in either branch of the family. The mother's brother died of phthisis, but it was not thought to be owing in any way to constitutional predisposition. The mother, anteriorly to her marriage, had suffered intense pain in the left side, accompanied by hysteria; subsequently to her marriage, and during the pregnancy which speedily followed, there was no diminution, but rather an increase, of these sufferings. The pregnancy was attended by violent vomiting; and the pain in the side becoming more and more insupportable, opiates were largely resorted to for its relief. About this time Sir Benjamin Brodie was consulted, and his written opinion expresses the belief that she was suffering from renal oxalate-of-lime calculus. There were no unusual circumstances during parturition.

At five years of age the boy was received into the Asylum for Idiots at Earlswood. He was then a fair and delicate child,

three feet three inches in height, fifty-three pounds and a half in weight; the shape of his head was oval, the circumference above the eyebrows eighteen inches and five eighths, length between the eyebrows and occipital protuberance eleven inches and three quarters, width of forehead four inches and a half. At this time he could stand alone, but was unable to walk; he was fed with a spoon, as he had no notion of masticating, and it was necessary for his nurse to convey the food to the fauces in order to excite the reflex act of deglutition. He could not speak, and was very spiteful. His habits were dirty, and this was augmented by frequent diarrhœa. When seven years old he was able to walk, though feebly, and was placed in the infant class for training and instruction. At nine, the period of his death, he could walk and run, his spiteful habits had been overcome; he was mild and tractable, and exhibited much fondness for his younger brother. He was timid, and afraid of certain toys, did not play with other children, and found most amusement in looking at a picture scrap-book. He was fond of listening to music; had little or no power of imitation. Although great pains were taken to instruct him, he could scarcely be said to have learned anything. He would in some measure go through simple exercises in drilling at command, but could not be taught to throw a ball with any aim. There was no want of co-ordination in his movements, and no diminution of sensation; his habits had become moderately correct; he was able to feed himself with a spoon, the meat having been previously minced, and with much difficulty he was taught to raise a cup to his mouth. He remembered his father and mother; on seeing any lady in black, the colour usually worn by his mother, he would approach, and after examination would say, "No mamma! no!" which, with the word "*me*" when he wanted anything, was the full extent of his powers of utterance. He had no vivacity, and his extreme pallor was remarkable.

His physical health was far from good; he was never long free from either strumous ophthalmia, eruptions at the nasal and oral orifices, thecal abscesses, or diarrhœa; but he had

never been subject to convulsions or epileptic fits. He died from pneumonia on the right side.

A post-mortem examination was made thirty-three hours after death. The right lung was hepatized throughout, except at its anterior margin. Several of Peyer's glands in the ileum were enlarged and congested. The large intestine extremely congested throughout. The testes had descended into the scrotum, but were small; the pubes was sparsely covered with hair. The other organs were healthy.

The calvarium was of normal thickness, but somewhat unsymmetrical; there were granular patches in the arachnoid on both sides of the longitudinal fissure, and between these and the dura mater slight adhesions. The encephalon weighed two pounds eight ounces avoirdupois; the cavity of the arachnoid contained about two ounces of straw-coloured serum; the membranes and sinuses normal. The antero-posterior diameter of the cerebrum was six and a half, its width five and a half inches; the width of each hemisphere, measured across the anterior lobe, in front of the remnant of the corpus callosum, two and a quarter inches. The antero-posterior diameter of each hemisphere of the cerebellum was two and a quarter, its entire width three and a half inches.

On making sections of the cerebrum and cerebellum, there was nothing noticeable respecting the size, form, arrangement, or colour of the convolutions. On the first removal of the encephalon from the cranium, it was noticed that, on being placed in its natural position, the hemispheres separated to an unusual extent, without bringing into view the great commissure of the brain, but displaying, instead, the velum interpositum. Anterior to the velum, and on the same plane, was exposed, on forcibly separating the hemispheres, a narrow band of medullary structure. A horizontal section of both hemispheres, so as to display the interior of the lateral ventricles, was then made, and the velum interpositum removed. The brain was in no part of its structure deficient in cohesion; the posterior cornu of each of the lateral ventricles was enlarged, and contained

about half an ounce of straw-coloured serum each. The small hippocampus on each side was rather large; the tænia semicircularis very fully developed. At this stage of the dissection no remnant of the fornix could be discerned; there was positive absence of any septum lucidum. The third ventricle was exposed, but no middle commissure could be discovered; the pineal gland occupied its usual position between the lobes of the corpora quadrigemina, all which structures were of normal size and appearance. At the anterior boundary of the third ventricle there was the before-mentioned medullary band, which was regarded as the representative of the corpus callosum, but occupying a much lower plane than the normal position of the commissure. It presented, both anteriorly and posteriorly, crescentic, thinned margins, and measured at its narrowest part, which was slightly to the left of the mesial line, one third of an inch. A section was then made through both hemispheres on a level with the transverse band. The optic thalami were unusually flattened, and their inner surfaces indicated that the soft commissure had never been present. There was a marked absence of the peduncles of the pineal gland. The third ventricle presented on its floor the usual structures, and at its anterior part could now be seen the anterior pillars of the fornix ascending at slight angles, but widely separated throughout. Beneath the posterior margin of the transverse band they made a sudden bend, and, passing outward and backward over the upper surface of the optic thalami, terminated in the descending cornua of the lateral ventricles as the tæniæ hippocampi, the tæniæ, however, being narrower than usual. The optic commissure at the floor of the third ventricle was strongly marked, and the lamina cinerea interleaved between it and the anterior commissure, where it terminated. The anterior commissure was well defined, and above it an interval of two lines occurred between it and the transverse band. The inner surfaces of the anterior lobes of the cerebrum were separated inferiorly as far as the anterior commissure; and the parts of them into which the knee and reflected portion

or rostrum of the corpus callosum are usually inserted were covered with convolutions such as are common to other parts of the cerebral surface. The band or rudiment of corpus callosum was situated opposite the widest portion of the corpora striata; its anterior edge being two and one-twelfth inches from the anterior margin of the cerebral hemispheres, and its posterior border being four and one twelfth inches from the posterior margin of the hemispheres. It did not exceed one sixteenth of an inch in thickness at any part of it, and its fibres spread out anteriorly and posteriorly on reaching the hemispheres. It will follow from this description that there was no representative of the germ or of the reflexed portion of the corpus callosum; that the body of the fornix, septum lucidum, and its fifth ventricle, and the soft or middle commissure, were entirely absent; and that there existed no communication between the lateral representatives of the fornix; moreover, that these had no connexion with the posterior diverging fibres of the transverse band, and consequently that not even the analogue of a septum lucidum was present.

Mr. Paget, in the twenty-ninth volume of your 'Transactions,' has grouped together with his own case others related by Reil, Mr. Solly, and Mr. Chatto, and has made some important physiological deductions. The case related by him was "not remarkable for any excellence or great defect of mind." In Mr. Solly's, the boy, although "boobyfied," could read, and selected as his favorite reading religious books. Reil's case, a woman, was of dull intellect, but could go errands in the village. Mr. Chatto's patient lived only twelve months.

In comparing the case which has been here detailed with those referred to by Mr. Paget, it would, at first sight, appear to stand opposed to the conclusions at which he arrived, and to support the view that the corpus callosum is necessary to the possession of the average power of the human mind. But this opposition may be *only* apparent; for it is a circumstance worthy of special regard in instituting a comparison, that while in the three above-named

examples the soft commissure was present, in the one which I have brought forward it was entirely absent. Moreover, in Mr. Solly's case, the soft commissure was "wide and thick," and in Mr. Paget's it was inordinately large, measuring six tenths of an inch from before backwards, and being also thicker than usual.

How far the presence of extra large, middle commissures compensated for other deficiencies in the former cases, and how far its absence was the cause of the extreme mental deficiency in the present instance, I shall not now discuss. I will only say that my researches hitherto lead me to attach a physiological importance to the soft commissure which previous observers have not recorded.

SYPHILITIC INOCULATION,

AND ITS

RELATION TO DIAGNOSIS AND TREATMENT.

BY

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Some of the points referred to in the following communication I have already had the opportunity of laying before this Society, and some others have previously been alluded to elsewhere, but the whole of the facts connected with syphilitic inoculation have not hitherto, so far as I am aware, been collected in a condensed and separate form.

The most ordinary kind of syphilitic inoculation is that in which the morbid action commences immediately upon the application of the poison, and produces a well-formed pustule within the first few days; but the form of disease which is of so much importance, as far as the patient's constitution is concerned, is one which often has a period of incubation, usually of some weeks' duration. It commences as a pimple, a crack, or an abrasion, and results in the adhesive form of inflammation. The first of these diseases is generally, but not always, developed upon a part which retains much of its natural softness or pliability; the second is generally, but not always, developed upon a part which becomes indurated in a very peculiar and characteristic manner. In cases where the induration fails to furnish the requisite information, the nature of the secretion will, as a rule, supply it. The first-mentioned morbid

action will produce well-formed pus, which can ordinarily be recognised by the naked eye, and this product will continue puriform until the disease terminates; the second morbid action will, during a great part of its course, produce no pus at all, and in cases where for a short period pus is produced it will depend upon accidental cause, such as would produce suppuration from any abraded or irritable part. In other diseases the different kinds of inflammation which are produced as the result of inoculation have not been unnoticed. Thus, in describing the effects of the vaccine virus, Jenner[1] remarks that pustulous sores often appear spontaneously on the nipples of cows; and that instances have occurred, though very rarely, of the hands of the servants employed in milking being affected with sores in consequence. These pustules, he observes, are of a much milder nature than the results of the contagion which constitutes the true cowpox. They are, he says, incapable of producing any specific effects upon the human constitution, and are noticed lest a want of discrimination should lead to the idea that the persons affected were in any measure thereby secured from the infection of the smallpox.

In a paper which I had the honour of laying before this Society in the year 1856, the corresponding differences in the kind of inflammation produced by the inoculation of different forms of syphilitic disease were insisted on, and the fact particularly pointed out that the secretion of the adhesive form of inflammation could often not be inoculated a second time upon the system which had produced it. These conclusions I have now reason to believe are generally acknowledged by the profession, although as late as the year 1858 we find M. Ricord, in his 'Leçons sur le Chancre,'[2] telling his pupils, "Ce que je veins de dire de l'inoculation et des développements du chancre, se rapporte presque aussi bien a l'une qu'à l'autre de ses variétés." The period of incubation which so often occurs in the adhesive action, and the difficulty with which that action

[1] 'Jenner on the Cowpox,' ed. 1800, p. 7.

[2] Vol. x, p. 31.

can be reproduced, present several points of the greatest practical interest. These will be included in the present inquiry.

Besides the adhesive, and the suppurative actions, the application of the syphilitic poison is liable to be followed by two other distinct morbid processes. In one of these the virus is taken up by the lymphatics, and generally reproduces its specific action in the absorbent gland into which these first empty themselves; in the other, the part infected passes into a state of mortification, which may involve the destruction of the poison. Similar morbid actions have been observed after the application of other animal poisons to the surface of the human body. Thus, Jenner[1] remarks that the variolous matter may undergo such a change from the putrefactive process, as well as from some of the more obscure and latent processes of nature, as will render it incapable of giving the smallpox in such a manner as to secure the human constitution from future infection. At the same time, he observes, the variolous matter so changed is capable of exciting a disease which bears so strong a resemblance to it as to produce inflammation and matter in the incised skin, swelling of the axillary glands, general indisposition, and eruptions. "This spurious action is often accompanied by more violent inflammation than that which occurs when the variolous matter produces its perfect effect upon the system."[2] These remarks are not intended to imply the existence of any strict analogy between the action of the syphilitic and other morbid poisons, but to show that any of these may be so modified by accidental circumstances and constitutional peculiarities as to produce different kinds of action under different circumstances.

The observations and illustrations which follow will have reference to the two principal kinds of syphilitic inoculation only, namely, that which produces the specific adhesive inflammation and that which is followed by the suppurative inflammation. The complications resulting from lymphatic

[1] 'On Vaccine Inoculation,' ed. 1804, pp. 31, 32.

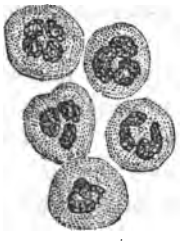
[2] Ibid.

absorption and mortification will, therefore, not be further noticed at present.

Whenever a sore which, if left to itself, will infect a patient's constitution, can be traced through its different stages, it will always, I believe, at some period or other, present the characters of the specific adhesive inflammation. The sores which, on the other hand, do not, in their natural course, infect a patient's system present the characters of the suppurative inflammation. The secretion produced by the adhesive inflammation consists of globules of different sizes and shapes, mixed commonly with epithelial débris, and floating in a transparent fluid. The globules may assume every appearance, from that of an ill-formed pus-corpuscle to that of an epithelial scale. It will sometimes happen that the primary infecting sore produces no fluid secretion whatever, and then epithelial scales, more or less perfectly formed, can alone be obtained from its surface. It is true that these sores often do suppurate for a short time, or are preceded by other affections that yield a puriform secretion, but nevertheless the distinctive characters of the adhesive inflammation will always, I believe, be established before the occurrence of secondary symptoms.

The suppurating, non-infecting, sores, on the contrary, yield a purulent secretion during the whole time of their continuance. The difference between the secretion of an infecting and a non-infecting sore is shown in the accompanying illustrations, which were drawn on wood by my

FIG. 1.



Microscopic appearance of secretion of local suppurating syphilitic sore, treated with acetic acid, × 700.

FIG. 2.

Microscopic appearance of cells of altered epithelium of an infecting sore, × 700.

friend, Professor Beale. Fig. 1 represents the secretion from a suppurating, non-infecting sore, when treated with acetic acid, and examined under the microscope with a power of 700 diameters. Fig. 2 represents the secretion from an indurated, infecting sore, treated in the same way and examined with the same power.

As a rule, the secretion from an infecting sore produces no result when inoculated upon another part of the same patient. Inoculation, then, in such cases, is worthless as a means of diagnosis, except in respect of the negative evidence which it affords; but although the secretion from an infecting sore cannot usually be inoculated upon the same patient, the habitual communication of the disease from one person to another shows that it may readily enough be inoculated on another individual who has not previously had the same affection. In cases, however, where an infecting sore has been irritated, the secretion from its surface will become altered in its characters, and then it will, if inoculated upon the patient himself, produce an irritation or even a pustule of a few days' duration, but this will bear no resemblance to the original disease.

The drawing, Plate VIII, fig. 1, represents an indurated sore, the secretion of which, when inoculated, gave no result; but, after the sore had been made to suppurate artificially, the inoculation of its secretion produced a kind of pustule, which is represented on the eighth day of its appearance in Plate VIII, fig. 2; after this the abortive pustule began to die away, and is represented declining on the ninth day (fig. 3); it then soon disappeared altogether.

Inoculation of the secretion from a naturally suppurating sore furnishes an accurate mode of diagnosis. The effect commences upon the application of the poison, and results in a well-developed pustule within a week. This action constantly follows the application of the poison to an abraded surface, or its introduction beneath the cuticle, and it may be repeated in succession from the same original source a very great number of times. But, however often repeated, it does not produce constitutional syphilis, and therefore those

who have practised this mode of treatment should not have named it "syphilization." The true syphilization is that disease which is communicated to a patient's constitution by the infecting sore, and there is too much reason to believe that this is not unfrequently accidentally conveyed from one person to another in the ordinary and normal relations of life.

It sometimes happens that the suppurating sore is surrounded by a considerable amount of induration, and that that induration, from some particular circumstances, terminates abruptly, very much in the same way as the induration around an infecting sore. The kind of secretion from the surface of the sore will then afford a means of diagnosis, if the case be uncomplicated and the part has not been subject to any accidental cause of irritation. But if a doubt should still remain, the inoculation of the secretion upon another part of the patient's body will, in unmixed cases, furnish the solution. If the sore be of the naturally suppurating kind, the specific pustule will result within a few days. If the sore be of the indurated and infecting class, the inoculation will be followed by no result, or at most such as has been already illustrated in Plate VIII, figs. 1, 2, 3.

Some months ago a boy presented himself at King's College Hospital.[1] He was fourteen years old, and small for his age. There were no signs about him of his having arrived at puberty. He had had, as he said, one intercourse only. There was therefore the less chance of his having received more than one kind of infection. This lad, when he presented himself for advice had a phimosis, beneath which a circumscribed induration could be felt; a gland in the left groin was enlarged and hard. From the information derived from sensation alone I had no doubt that this was an infecting sore, and, therefore, I sent him to the Lock Hospital, in order that he might have a proper

[1] The cases referred to in this paper are given at length in an Appendix.

course of mercury. Before, however, beginning the treatment, I examined the secretion from the sore with the microscope. To my surprise, I found it distinctly purulent. The nature of the secretion then appeared to contradict the evidence derived from the sense of touch, and the test of inoculation was had recourse to. The specific pustule was produced, and the secretion from this again produced two other specific pustules, of exactly the same nature. It appeared, therefore, that if this were an unmixed case, the evidence given by the sense of touch had been fallacious, as it was clearly contradicted by the nature of the secretion and by the test of inoculation. The patient was therefore directed to discontinue the mercurial course which he had commenced two or three days previously, and was treated by steel pills and other non-specific remedies. The Plate VIII, figs. 4 and 5, are copied from a drawing made by Dr. Westmacott after the phimosis had subsided, and when the artificial inoculations were healed. At this period the secretion from one of the original sores on the penis was still purulent. The patient was kept in the Lock Hospital until he appeared quite free from any disease, and for a considerable period afterwards presented himself occasionally as an out-patient at King's College Hospital. During the time that he remained under observation he had no constitutional affection whatever, and I feel satisfied that had he had any up to the present time he would have again applied for relief.[1]

In this case, then, the evidence afforded by the nature of the secretion and by the test of inoculation corrected the erroneous impression that would have been and was conveyed by the sense of touch alone.

There are cases, however, in which neither the sense of touch, nor the nature of the secretion, nor the result of inoculation, will give positive information as to whether the patient will have secondary symptoms. These are the *mixed* cases, in

[1] This patient again showed himself at King's College Hospital on the 31st of May (seven months after infection), without the least trace of constitutional disease.

which a twofold inoculation has taken place. They occur, for the most part, in those who have never suffered from constitutional syphilis, for the obvious reason that, in those who have so suffered, inoculation of one kind can rarely and with difficulty be performed.

Twofold inoculation may occur either in the same or in different parts, at the same or at different times. When it occurs in the same part and at the same time, the results of the inoculation of the secretion from the suppurating sore will first develop themselves, and, subsequently, the results of the inoculation of the secretion from the infecting sore. This depends upon the different period of incubation which naturally belongs respectively to each kind of disease.

It is probable that the two actions resulting from the two kinds of inoculation cannot go on exactly in the same part at the same time, but they may be in such close proximity, or may follow each other so closely in point of time, that their respective effects (as regards the character of the secretion, &c.) cannot be closely distinguished. The secretions from two different kinds of inoculation may then become mixed together, and if inoculated in that condition, a twofold result may follow. In that case the suppurating sore would first run its course, having all the appearances of a soft, non-infecting chancre, and afterwards (perhaps as this sore was healing up) the adhesive and infecting form of inflammation would appear. The cases in practice which have led to the greatest confusion are those in which the inoculation of the secretion from a suppurating sore has followed, after the lapse of three or four weeks, the inoculation from an infecting sore. We have, then, the results of two kinds of inflammation, and their respective products in close proximity. The suppurative inflammation does not, then, *prevent* the infection of the patient's constitution; the adhesive inflammation does not *prevent* the appearances of the "specific pustule." The means of diagnosis which would refer these mixed sores either to the infecting or to the suppurating class exclusively are therefore absent.

Much confusion has arisen and many grievous mistakes have occurred from the assumption that every sore must necessarily, at any given time, present the characters exclusively either of the infecting or non-infecting variety. Nature is, as I believe, always true to herself, and if interrogated fairly, she will furnish a faithful answer. But this answer is given at her own time and in her own way. If the surgeon demands an immediate response the first time he sees a syphilitic sore, he may be disappointed; but if he will carefully watch the course of the disease, he may with confidence rely upon the information he receives. If a persistent form of suppuration be established after inoculation, natural or artificial, *that* disease is of the non-infecting kind, as far as the patient's constitution is concerned. If the adhesive form of inflammation be established, although after the lapse of some weeks, secondary symptoms will follow. If both kinds of inflammation be present, then the patient has received a twofold inoculation, and each disease will run its course, modified, perhaps, by, but in spite of, the other.

Out of 100 consecutive cases which I collected some years ago, of sores which at that time I had diagnosed as of the suppurating kind, two of the patients presented themselves subsequently with secondary symptoms. Upon making further inquiry, I found that in both these cases the patients had exposed themselves to more than one source of infection. A good example of this kind of double contagion is afforded in Case No. 2 in the Appendix. The patient here had an induration which presented all the characters of the specific adhesive inflammation, and this had produced its natural result, namely, a secondary syphilitic eruption. But he had also a puriform discharge from beneath the prepuce, which, being inoculated upon another patient, produced the "specific pustule." Now, in this case a considerable period must have elapsed for the development of the infecting sore and its consequent secondary symptoms, and the very great probability is that the disease which produced the suppuration was received some weeks after that

which produced the infecting sore. This case is now referred to, particularly as it was from it that the discharge was derived for one series of inoculations to be presently described.

Much uncertainty has been thrown over the conclusions derived from the results of syphilitic inoculations from the uncertainty (often much exaggerated by authors) of the degree in which different individual constitutions might modify the effects of the poison. Some have gone so far as to attribute the different results of inoculation altogether to the difference in the constitutions of the patients. A case has lately presented itself to me in the Lock Hospital, where, from peculiar circumstances, fully detailed (Case No. 3) in the Appendix, I had an opportunity of trying the effect of the inoculation of the secretions from different kinds of syphilitic sores, primary and secondary, upon the same patient. The different series of inoculations were therefore carried on under precisely the same circumstances, and some of them at exactly the same time. And the differences, which were marked in the strongest possible manner, were entirely due to the difference in the nature of the secretions inoculated. The order in which the inoculations were made will be fully given in the appendix. At present I purpose to state briefly the effect of each series of inoculations, independently of the rest, and of the precise date at which they were performed.

Some of the secretion from a well-developed primary indurated sore, of from two to three weeks' duration, and containing no pus-globules, was taken upon two little points of bone, such as are used for the purpose of ordinary vaccination. The cuticle having been pierced by a lancet, the points of bone, charged with the secretion from the primary infecting sore, were introduced beneath it, and allowed to remain several hours. A kind of abortive pustule was produced in each situation. The secretion from this was again inoculated on the third day, and produced a small spot or pimple. Beyond this no result could be produced by any further inoculation from this source. The appearances of the first

inoculations on the twelfth day, and of those second in order on the tenth day, are shown in Plate IX, figs. 8 and 9, which are copied from drawings by Dr. Westmacott.

Some of the secretion was taken from a highly inflamed mucous tubercle, which accompanied and formed part of a set of secondary symptoms which had appeared for the first time in another patient. This secretion was inoculated in the same way with the ivory or bone points, and the results were very similar to those produced by the inoculation of the secretion of the primary indurated sore. A kind of pustule was produced by the first inoculations, the pustular character depending probably in part upon the irritation produced by the prolonged contact of the bony points. The secretion from these first inoculations was again inoculated in the ordinary way with the lancet in two places, and two small, livid spots or pimples alone were produced. As much fluid as could be obtained from these was again inoculated, and similar spots or pimples were produced. After this no inoculable secretion could be obtained from any of this series.

The drawings in Plate VIII, marked 6, 7, and 8, represent this series of inoculations on the twelfth, the eighth, and the fifth day respectively; and Nos. 9, 10, and 11 represent the same series on the twenty-fourth, twentieth, and the seventeenth day respectively. After this the appearances gradually faded away, and no further results have appeared from any of the foregoing inoculations.

Had these inoculations been performed on a patient who had never had constitutional syphilis, an indurated and infecting sore would, after a certain period of incubation, in all probability, have followed; and I take for granted that the reason why such modified results only were obtained was that the syphilitic poison had, on a former occasion, produced its full effect upon this patient's system. As it was, the secretion from the primary indurated sore produced an affection which could be again inoculated a second time only, and the secretion from the inflamed mucous tubercles produced an affection which could be reinoculated

a third time only. After this the appearances of the inoculations in both cases gradually died away.

In strong contrast to these results are the effects produced by the inoculation of the secretion of a mixed (indurated *and* suppurating) sore, and from the patient's own serpiginous sores.

As the previously mentioned inoculations had shown that this patient was susceptible to only a very slight and modified effect from the secretion of a primary infecting sore, the results now described must have been from suppurating action superinduced upon the adhesive in the patient from whom the inoculated matter was taken. (See Case 2.)

Some secretion received on the point of a lancet was inoculated at two points in the ordinary way. On the third day an incipient pustule (Plate IX, fig. 4) surrounded by a red areola, had appeared in each situation. These were allowed to run their course, and became superficial suppurating sores, of the size of a fourpenny piece. Their appearance is represented on the twelfth day (Plate IX, fig. 5). Some pus from their surface, taken as soon as fully formed, was reinoculated, and produced exactly similar superficial suppurating sores (represented in Plate IX, fig. 6). The inoculation third in order is also represented on the third day (Plate IX, fig. 7); as compared with the first inoculation in this series, at the same period (Plate IX, fig. 4), it appears to be quite as fully developed, and to be surrounded by as distinct an areola. The inoculations from this source were carried on through seven series, an ordinary suppurating sore being produced without fail on each inoculated point.

In the last series of inoculations to be noticed, the secretion was from the patient's own very irritable and serpiginous sores. Upon each inoculated point a very well-developed and fully formed pustule appeared within the first few days. These pustules were depressed in their centres, and when they broke left exceedingly irritable ulcers. These ulcers were extremely painful, and surrounded a deep-red margin. A series of three sets of inoculations were performed, and the poison appeared quite as active

and virulent at last as at first. Plate IX, fig. 1, represents the first inoculation which was made, on the sixty-second day of its progress; Plate IX, fig. 2, the exceedingly well-developed pustules resulting from the inoculations second in order, on the eighth day of their existence; and Plate IX, fig. 3, the circular, irritable sores that were left after the inoculations third in order, on the twenty-first day of their progress.

Considering that this patient had had his serpiginous sores for a period of between five and six years, and that, in spreading from one part to another, fresh portions of skin were constantly being inoculated, it might have been supposed that something like an immunity to further inoculation would by that time have been acquired. It is true this patient was syphilized, in the proper sense of the word, and, from some previous infection of his system, was not susceptible to the effects of inoculation, either from a primary indurated, or from secondary sores, except in a very modified manner; but it is equally clear that the long and continuous course of self-inoculation to which he had been subject had not rendered him insusceptible of inoculation from either the ordinary suppurating sore or the more virulent poison secreted by his own ulcers. From the result of this case, and from a few others in which I have tried it, I do not doubt that fresh inoculations from suppurating sores during the time of their development check the activity of other diseases of the skin; and this they do, I conceive, by a species of counter-irritation. Under this mode of treatment ulcerations of the skin will heal, and syphilitic eruptions will disappear, but it is because other sources of irritation have been established. The secretion from the suppurating syphilitic sores is a convenient mode of keeping up such a kind of counter-irritation, because, without any pain to the patient, it ensures a continued suppuration for a certain number of days. This suppuration is usually of a very limited extent, but it may be carried on in a great number of places at the same time, and its duration may be accurately regulated by the number of successive inoculations performed.

The secretion from the unmixed indurated or infecting sore is of no use in this so-called syphilization. It is for some form of constitutional disease that this mode of treatment has been particularly recommended, and here the inoculation of the secretion from the indurated sore, as a rule, produces no result; on the other hand, the secretion from the suppurating form of chancre, although it may afford a valuable mode of maintaining counter-irritation on the skin, cannot, from its nature, be considered as a means of curing constitutional syphilis, inasmuch as it is itself a local disease, and does not produce any effect of a syphilitic nature upon a patient's system. When the secretion from a mixed (*i. e.* an indurated *and* suppurating) sore is inoculated upon a patient who has had constitutional syphilis, the result is, as a rule, the same as if the secretion of a suppurating sore only had been used; but if the same secretion were inoculated upon a patient who had not had constitutional disease, then a suppurating sore would be first produced, and, after a certain period of incubation, an induration would, in all probability, appear on the same spot, and would be followed by secondary symptoms.

This twofold inoculation naturally leads to the inquiry whether any other animal poisons may be inoculated together with the syphilitic. The nature of the subject forbids any direct experiments upon this point, as far as the infecting variety of syphilis is concerned, and clinical observations must therefore be relied upon. Such observations, with regard to ordinary vaccination, are not wanting, but nevertheless satisfactory conclusions have not hitherto been established. Mr. Simon, in the year 1857, collected together the opinions of 539 members of the medical profession in the United Kingdom and elsewhere, as to whether (among other things) a true Jennerian vesicle was ever a vehicle for syphilis, and whether such a poison could be unintentionally inoculated instead of the true vaccine lymph. The answers of the very great majority were decidedly in the negative upon both points; but, nevertheless, many gentlemen of experience recom-

mended caution with regard to the patient from whom the vaccine lymph was taken, and in some instances medical men of experience expressed their convictions that the syphilitic poison might be so communicated. Thus, for instance, Mr. Ackerly, of Liverpool, writes, "I have no doubt that syphilis has been communicated from a diseased to a healthy child by means of vaccination."

Dr. Bamberger, of Würzburg, says, "I am indeed convinced that contagious disease, syphilis, for instance, is communicable with the lymph in vaccination; nay, such a case has even happened a short time ago in a town but a few miles from this place. After due inquiry into all circumstances of the case, the practitioner was found guilty by the Court of Justice, and condemned to prison for several months."

Mr. Barber, of Stamford, says, "It is very possible that a minute quantity of blood may become mixed with the lymph, and we know not how small a quantity of blood may suffice to convey a constitutional or other taint."

Mr. Complin says, "Syphilis, I consider, might be communicated."

Mr. Douglas, of Bradford, says, "Twenty-five years' observation and experience lead me to conclude that the greatest care ought to be taken."

Dr. Lever, of Guy's Hospital, says, "I have known syphilis communicated to a child by the hand of a supposed, but legally educated, medical practitioner."

Mr. Startin is of opinion that the true Jennerian vesicle in a subject suffering under constitutional or acquired syphilis, may be the means of transmitting this disease, "which," he says, "he has many times seen transferred from such a vesicle."

Dr. Whitehead, of Manchester, mentions that he has "seen several instances of the transference of the syphilitic taint through the medium of vaccination." He believes that the inoculation of matter taken from a syphilitic sore, in any of its stages, is capable of producing its characteristic phenomena in the inoculated.

Now, it must be remembered, that these opinions were collected at a time when the doctrines of Ricord (as to the effects of syphilitic inoculation appearing immediately after the application of the poison) were well nigh universally received. At that period if no results showed themselves at the expiration of the first week, none other were considered possible. The popular belief then prevailing among medical men is well expressed by the published answer of M. De Meric, who says, "I do not believe that secondary symptoms can be transmitted by inoculation; hence (if I am right in holding Hunter's[1] and Ricord's opinion on this non-transmissibility) *it is impossible* to convey syphilis by vaccination, except the lancet have come in contact with pus secreted by a *primary ulcer*."

We have now been taught by clinical observation, and also by direct experiment, that the form of syphilis which infects a patient's constitution, has usually a period of incubation of some weeks before its effects develop themselves. And, inasmuch as it is this form of syphilis alone which is likely to be communicated by vaccination (and which alone would be of much consequence if it were so communicated), a fresh series of observations, aided by the additional light recently obtained, are required before the questions propounded can be considered as satisfactorily answered. Aided by recent investigations, Dr. Veinnois, in his thesis presented to the Faculty of Medicine in Paris in the year 1860, and also in the 'Archives of Medicine' for the same year, has collected together and given a detailed account of some cases in which an infecting syphilitic sore, or more properly speaking, the specific adhesive inflammation, followed vaccination.[2] Dr. Veinnois has carefully excluded those cases in which a fresh set of symptoms followed vaccination in patients who had previously had hereditary or acquired syphilis, and has confined himself to cases in which the primary affections could be clearly

[1] Hunter said that the secretions from secondary syphilitic infection were not inoculable *on the same body*.

[2] An abstract of these cases will be given in the Appendix.

verified, and their effects upon the constitutions of the patients satisfactorily traced. Dr. Veinnois' investigations have led him to the belief that, if the lymph from a vaccine vesicle be alone inoculated, the cow pox alone will be produced, but that if, in addition to this, the blood of a person affected with constitutional syphilis be inoculated at the same time, then that syphilis may also be communicated. The cow pox would then appear first, as having a shorter period of incubation; and after a time the syphilitic tubercle (or primary specific inflammation) would make its appearance upon the inoculated part, and would in due course be followed by secondary symptoms. The cases which Dr. Veinnois has collected, are related with so many circumstantial details, that if correctly reported, they cannot fail to establish the fact that the poison of syphilis and that of the cow pox may be communicated, and sometimes have been communicated, at the same time.

The principal conclusions to which I have been led in reference to the different points which I have now had the honour to lay before this Society, are, that there are two forms of syphilitic disease, distinguished in their origin by the adhesive and suppurative kinds of inflammation. That one is followed by constitutional symptoms, and that the other is not.

That the adhesive form of inflammation may be distinguished from the suppurative by the nature of the secretion which it produces, and by the results of inoculation.

That both kinds of action may be communicated to the same individual at the same time, and that then the suppurative action will develop itself first, as having the shortest period of incubation, and subsequently the adhesive action will run its regular course.

That when these two actions are developed upon the same part, the affection which results has not the characters exclusively of the adhesive or of the suppurative inflammation. A mixed form of disease presents itself.

That the specific adhesive inflammation may be communicated to a person who has not previously had the disease,

either directly by means of the discharge from a primary sore, or more indirectly through the secretions of a person affected with secondary symptoms.

That this latter mode of communication is not so common as the former, and appears to take place in general only when the part from whence the secretion is derived is in a state of increased or unhealthy action.

That under the circumstances last named, any open sore or abraded surface on a syphilitic patient *may* furnish an inoculable secretion.

That such open sore, or abraded surface, may be caused by mechanical irritation, by any secondary form of eruption, by a vaccine vesicle, or by a local suppurating syphilitic sore, in a person previously syphilitic.

That the blood of a syphilitic patient *may* communicate syphilis to a person previously unaffected with the disease.

That the cow pox and syphilis *may* be inoculated at one and the same time, and that when such a twofold inoculation does take place, the results are, in some respects, analogous to those which follow the inoculation at the same time of an infecting and a suppurating sore.

That the pure vaccine lymph, even from a syphilitic subject will not communicate syphilis.

APPENDIX.

Case 1.—Alexander John C—, æt. 14, but younger in appearance, applied to me at King's College Hospital in November, 1860. About a fortnight before he had had one connexion only. Upon examination it was found that he had phimosis, and beneath the skin a circumscribed induration could be distinctly felt. One of the glands in the left groin was enlarged. The induration beneath the prepuce was so perfectly well defined, and afforded to the touch so very much the sensation usually relied upon as

diagnostic of infecting sores, that I directed this patient to go as an in-patient to the Lock Hospital for the purpose of having a proper course of mercury. He was admitted on the 24th of November. When seen on the 27th, it appeared that there was more discharge than would usually be produced by an infecting sore, and this was therefore subjected to microscopical examination. It was found to consist entirely of well-formed pus. The patient was now inoculated with his own secretion on the thigh.

December 1st.—The inoculation had produced a well-developed pustule, surrounded by a red margin.

3rd.—The pustule had given way, and its secretion was inoculated in two places lower down.

8th.—Examination of the secretion of the original sore showed it to be distinctly purulent. The inoculations, second in order (of the 3rd instant), had produced two well-developed specific pustules.

He was directed to discontinue the mercury, which the house surgeon had ordered him a few days after his admission into the hospital. The three inoculations on the thigh produced three ordinary superficial suppurating sores, unaccompanied by any specific induration. These sores were healing on the 18th, and on the 24th they had skinned over. They were still, however, tender to the touch and red. The circumscribed induration could still be very distinctly felt beneath the prepuce.

January 15th.— Phimosis continues; the discharge from beneath it still distinctly purulent.

24th.—Phimosis relieved: an ulcer producing a purulent discharge still exists on the anterior part of the glans penis, around the orifice of the urethra. See Plate VIII, fig. 4.

February 14th.—Was discharged from the Lock Hospital as cured, having had no specific treatment, except the mercury which was administered for a few days after his first admission.

This patient showed himself at King's College Hospital perfectly free from any constitutional disease on the 31st of May following.

Case 2.—John T—, æt. 15, was admitted into the Lock Hospital on the 5th of April, 1861. It was found, upon examination, that he had phimosis: a purulent discharge issued from beneath the prepuce, which concealed a dense and circumscribed induration about an inch in length. A secondary eruption covered his body. He stated that the phimosis commenced two months ago, but no distinct history could be obtained with regard to the infection of this patient's system. The purulent discharge was inoculated on another patient (see Case 3), and produced the specific pustule only.

Case 3.—Henry C—, æt. 32, first came under my care at the Lock Hospital on the 10th of April, 1856. At that time there were some cicatrices of old sores upon the penis; a small fissure existed on the margin of the prepuce, and there was a poisonous bubo (tested by inoculation) with foul surface and excavated edges in the right groin.

He stated that four months previously some sores formed beneath the prepuce, which he was unable to retract. He attended St. Bartholomew's Hospital, under the care of Mr. Paget, and was subjected to a course of mercury. When the sores were nearly well, about two months after their first appearance, a bubo formed and was opened. Its surface assumed a foul character, and it remained without any disposition to heal for another two months. He was then admitted into the Lock Hospital, and underwent a great variety of treatment. He again took mercury, and the surface of the bubo was repeatedly destroyed with different kinds of caustic. In January following the bubo still remained open, when he was discharged from the hospital for drunkenness.

He applied again and was readmitted on the 24th of January, 1861. The original sore in the groin had now healed, but from the marks it had left it evidently had extended at different times over both nates and some distance down both thighs. The patient stated that the ulceration had never completely healed; once or twice it

had very nearly done so, but it broke out again and spread to some fresh part, and thus it had continued, healing in one place and spreading in another, ever since. During this interval he had been for seven months in Guy's Hospital under the care of Mr. Hilton. The sore was here again destroyed with nitric acid and with potassa fusa. He was ultimately, as he says, discharged as incurable from Guy's Hospital, and went to Camberwell workhouse. He remained in the workhouse for two months and was then sent to Margate, where he remained three months; and he returned again to the workhouse. On the 8th of October, 1857, he went a second time into Guy's Hospital, under the care of Mr. Cock, and at the expiration of ten weeks was discharged with two sores, of the size of a shilling, on the nates, one on either side of the anus. He now returned to his work, and continued sufficiently well to follow his employment until January, 1858, when the sores again became painful, and he was readmitted into the workhouse. Here he remained until January, 1859. By this time the sores had spread considerably on the inner side of the nates. He was again admitted into Guy's Hospital under Mr. Cock, treated as before, and again discharged all but well. He now returned to his occupation, and continued his work, that of a carpenter, for nine months. The sores again spread and involved the buttocks on both sides.

In May, 1860, he was admitted once more into the workhouse, where he remained until he was admitted the second time into the Lock Hospital. On his admission there were the cicatrices of old ulceration on the nates and upper and back part of both thighs, and some ulcers forming parts of circles were still open on the left side. These were extremely painful, and presented, on their surfaces, a number of small rounded eminences, some of them half covered by newly formed skin. The ulcerations having existed for a period of between five and six years, and the patient having had the advantage of being treated by different hospital surgeons, but without permanent benefit, I thought the case one in which (other remedies having failed)

repeated inoculation might be tried. Having explained the plan to the patient, and having obtained his full concurrence, I commenced the inoculations on the 5th of February. Some pus was taken from case No. 2, and inoculated on the right side of the patient's abdomen. On the 8th, specific pustules were produced and are represented in Plate IX, fig. 4, on the third day; and in Plate IX, fig. 5, on the twelfth day. The secretion from the artificial inoculations was reinoculated seven times in succession, and always produced the specific pustules. The appearances of the inoculations second and third in order are given in Plate IX, figs. 6 and 7. The inoculation eighth in order from this source did not succeed.

At the same time that the above series of inoculations was going on, a second series was commenced from the patient's own serpiginous sores.

On the 5th of February, some matter was taken from a sore on the right side of the nates and inoculated upon the patient's thigh. It produced an exceedingly well developed pustule, which broke and gradually assumed the appearance of a serpiginous sore. This is well represented in a drawing by Dr. Westmacott, copied in Plate IX, fig. 1. On the fifty-fourth day of the existence of this artificial sore some secretion from its surface was reinoculated in two places and produced two very fine pustules, represented (Plate IX, fig. 2) on the eighth day of their existence. The inoculations third in order from this source ran exactly the same course, and are represented (Plate IX, fig. 3) on the twenty-first day of their existence. The virus had apparently lost none of its activity, and the sores produced by inoculation from this source were so very painful and irritable that no further inoculations from these sores were attempted.

On the 9th of March some strong nitric acid was applied to the original serpiginous sores, as it had frequently been before. The inoculations were allowed to run their course.

On the 14th, the ulcers touched with the acid had assumed a more healthy appearance.

On the 28th, some secretion from some highly inflamed

mucous tubercles, forming part of a secondary eruption which had recently appeared upon another patient, was inoculated on the right side of Henry C—'s chest. This made the third series of inoculations which were going on at the same time. In order to ensure the prolonged contact of the matter, some of the secretion was in this instance taken on some points of bone or ivory, and these were inserted beneath the cuticle and retained by means of plaster in their position.

The inoculations produced patches of circular inflammation, and in one of these a kind of pustule formed. The secretion from this was again inoculated on the 1st of April, and two abortive pustules were produced. The secretion from these was again inoculated, and produced only small circular patches of inflammation without any fluid secretion. The appearances of this series of the inoculations on the twelfth, eighth, and fifth days are represented in Plate VIII, figs. 6, 7, and 8, and in figs. 9, 10, and 11, on the twenty-fourth, twentieth, and seventeenth days respectively. After the inoculations third in order no further results could be obtained from this source.

On the 9th of April the secretion from a well marked primary indurated sore, of between two and three weeks, duration, was inoculated in two places by means of the ivory points on this same patient.

On the 11th, two small abortive pustules were produced, but it was at the time supposed that the prolonged contact of the ivory points may have had some part in producing these pustules. The secretion from these artificial inoculations was again inoculated, and the result was only some small and inflamed points, yielding no fluid secretion. No further result could be obtained from this source. The appearances produced in this fourth series of inoculations are represented (Plate IX, figs. 8 and 9). The inoculations first and second in order are shown on the twelfth and tenth days respectively.

On the 23rd of April all the inoculations in the third

and fourth series had dried up. The original serpiginous sores had now much improved in appearance.

On the 16th of May the original serpiginous sores were again freely touched with nitric acid. The inoculations from this source were still extremely irritable, and were allowed to run their course.

May 23rd.—An inoculation, the eighth in order of the second above-mentioned series, was made this day.

30th.—The inoculation of the 23rd had produced no effect. The superficial suppurating sores produced by this series were now healing.

June 6th.—The original serpiginous sores had now healed, except in one point which still appeared very irritable. The inoculations belonging to the second series had been repeated without result. Fresh inoculations from the sores of the second series yielding the largest amount of purulent secretion were repeated

13th.—The inoculations last made had succeeded as before, showing that the failures recorded on the 30th of May and 6th of June depended upon some accidental cause.

20th.—The inoculations of the second series still succeeded. The original serpiginous sores were again destroyed by nitric acid.

27th.—No fresh inoculations had been made. The whole of the inoculations of the second series had dried up.

July 5th.—The inoculations from the patient's own serpiginous sores were nearly healed, having been touched with nitric acid. The sores themselves still remained unhealed in two places, and are of the size of a fourpenny and sixpenny piece respectively.

12th.—One of the original serpiginous sores is still unhealed, and of about the size of a threepenny piece.

August 31st.—The original sore is still unhealed, and is now of the size of a shilling, with irregular and abrupt edges.

Abstract of cases collected by Dr. Veinnois in the 'Archives Générales de Médecine' for the year 1860 (tome xv, p. 657, et seq.), *in which Syphilis appeared to be communicated by vaccination.*

Mme. N. N— was delivered of a child in 1858. This child was evidently syphilitic, and communicated the disease to more than one wet nurse. The child was vaccinated, and the uncle and aunt were vaccinated from the child. After the vesicles in these were dried up, a hard, rough crust formed, which was surrounded by a reddish yellow areola.

The uncle was soon covered with scabs, and had affections of the bones and ulcerations. His symptoms were not cured until the expiration of five years. The aunt had ulcerations of the vulva and condylomata around the anus; she had also enlargement of the cervical glands and inflammation of the eye. She recovered about the same time as her husband.

In the 'Medicinishe Zeitung' of Berlin for the 3rd of April, 1850, the particulars are related of nineteen cases of persons between the ages of eleven and forty, who were infected in consequence of vaccination. *Three or four weeks after* the vaccination, ulcers—syphilitic in appearance— made their appearance on the vaccinated points, and these were followed in the majority of cases with secondary symptoms. The child from whom the lymph was taken was apparently healthy at the time, but subsequently had syphilitic roseola, and died a few days afterwards.

The vaccine vesicles in this child were not regularly developed. It was not until the tenth day that any lymph was produced that was considered fit for use.

On the 4th of May, P—, æt. 25, was revaccinated in accordance with the regimental regulations. The vaccine virus was taken from the arm of another soldier, who, three

months previously, had had an infecting chancre. Abortive pustules only were produced. One of these became inflamed at a later period, and gradually assumed all the characters of an indurated chancre. Its base was hard, and it was accompanied by indolent enlargement of axillary glands in the armpit of the same side. Constitutional syphilitic affections followed. ('Gazette des Hôpitaux,' Paris, Août, 1859.)

Another soldier, vaccinated shortly after from the same source, had a series of symptoms of exactly the same nature, which resulted in confirmed syphilis.

These two patients had never had any other syphilitic disease. They were the last of a number who were vaccinated, and the gentleman who performed the operation recollected afterwards that at the time he had exhausted his supply of vaccine lymph, and had taken up a little of the blood of the part upon his lancet.

A child, six years of age, previously in good health and with healthy parents, was vaccinated. An ulceration appeared at the vaccinated point, and was a long time before it healed. An eruption then appeared on the child's body. At the expiration of three years the child had copper-coloured blotches on its arms, and ulceration of the throat. ('New York Medical Times,' August 2nd, 1854.)

Cases No. 2, No. 14, No. 56, and No. 57, from the tables of Dr. Whitehead, of Manchester, are related at length by Dr. Veinnois, as instances of syphilis communicated by vaccination.

Three medical men inoculated themselves with the fluid from the varioloid pustules of a child born of a syphilitic mother. The first had nothing. On the second, syphilitic ulcers were produced, which were followed by secondary symptoms. The third was seen by M. Heine, who relates the observation, with syphilitic psoriasis, some years afterwards. ('Beiträge zur Lehre von der Syphilis,' Würtzburg, 1854.)

To the above may, perhaps, be added a case which fell under my own observation at King's College Hospital.

J. W. T—, was vaccinated at the age of seven months, on the 16th of June, 1859, having been perfectly healthy up to that period. His mother appeared a perfectly healthy woman, and stated that her husband had always enjoyed good health. This little patient when brought to the hospital in the beginning of the year 1861 (having previously been subject to a variety of treatment) presented numerous dark copper-coloured patches over his body, and especially on his lower extremities. These I considered to be syphilitic. On examining the child's arm the cicatrix left by the vaccination was very apparent, and was slightly harder than the surrounding skin; but that which particularly attracted attention was the existence of chronic enlargement of a gland in the axilla. This was hard, accurately defined, and not tender to the touch. The child was treated by mercury, and recovered. The mother continued to bring him to the hospital long after he had lost his eruption. She also brought the medical certificate of successful vaccination under the compulsory vaccination act.

DESCRIPTION OF PLATE VIII.

Fig. 1.—Irritated primary indurated sore.
„ 2.—Inoculation from 1, on the the patient's thigh, eighth day.
„ 3.—The same inoculation, ninth day.
„ 4.—Cicatrized primary sores on glans and prepuce, which caused phimosis, and were accompanied by considerable induration. This could not be distinguished from the induration of infecting sores. There was also enlargement of one gland in the left groin.
„ 5.—Inoculation from 4, on the patient's left thigh.
„ 6.—Inoculations of secretion from secondary inflamed mucous tubercles on twelfth day.
„ 7.—Inoculations from inoculations (6), eighth day. These inoculations formed pustules, which had now dried up.
„ 8.—Inoculations from inoculations (7), fifth day.
„ 9.—Inoculations from inflamed secondary mucous tubercles; appearances on the twenty-fourth day.—The same as 6.
„ 10.—Inoculations second in order from 9; appearances on the twentieth day.—The same as 7.
„ 11.—Inoculations, third in order from 10; appearance on the seventeenth day.—The same as 8.

DESCRIPTION OF PLATE IX.

Fig. 1.—Artificial inoculation on the sixty-second day, from a serpiginous sore of six years' duration.
„ 2.—Inoculations from inoculation (1) on the eighth day.
„ 3.—Inoculation, third in order, from patient's own serpiginous sore; appearance on twenty-first day.
„ 4.—Inoculations from indurated and infecting, but inflamed and suppurating sore.—Third day.
„ 5.—Inoculations from indurated, but suppurating sore; appearance on twelfth day.
„ 6.—Inoculations, second in order from 5.
„ 7.—Inoculation, third in order from 6, third day.
„ 8.—Inoculation of secretion of primary indurated sore. No pus-globules in the secretion.—Twelfth day.
„ 9.—Inoculation, second in order from 9, tenth day.

Plate VIII.

1.

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7.

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1.

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9

CASES ILLUSTRATING THE CAUSES AND EFFECTS

OF

FIBRINOUS OBSTRUCTIONS IN THE ARTERIES,

BOTH OF THE BRAIN AND OF OTHER ORGANS.

BY

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Since the publication in the 'Transactions of the Society' of the paper by Dr. Kirkes, on "Obstruction in the Cerebral Arteries," numerous cases bearing upon the subject have been brought forward. The opinions expressed by Dr. Kirkes in the paper alluded to have been much canvassed, and although they have in a great measure been adopted by pathologists, yet objections have been raised to some of these views, and reasons have been adduced for doubting the cardiac origin of the fibrinous plugs found in the cerebral arteries. It appeared therefore to the author that it would be desirable to collect together and to analyse as many cases as might be available, and in this way to endeavour to estimate the amount of evidence both in favour of and against the theory which supposes that these obstructions depend on fibrinous concretions or vegetations washed away from the cavities of the heart.

In the following communication accordingly the fatal cases bearing upon this subject which have passed under the author's observation have been collected together, and they include all that have occurred in the Middlesex Hospital during the last eight years. As some of these cases

have been published before in the 'Pathological Transactions' and elsewhere the headings only of these cases are given.

Moreover as the arguments in favour of the cardiac origin of these obstructions depends much on their association of the so termed fibrinous deposits in the internal organs it was necessary to enumerate the examples of these formations. The examples of fibrinous deposits are taken from the post-mortem records of the Hospital from 1853 to 1859.

The cases have therefore been divided into four groups. In the first group (eleven cases) are placed all those examples in which a plug in one of the cerebral arteries has been found associated with disease of the brain or hemiplegia. In the second (three examples) are placed certain incomplete cases in which softening of the brain has been found associated with warty growths on the valves of the heart, but in which the state of the cerebral arteries was not ascertained. In the third group are two instances of cicatrix of the brain. The fourth group (twelve cases) consists of the examples of fibrinous deposits in the internal organs but in which there was no affection of the brain.[1]

GROUP I.

Examples in which a plug in one of the cerebral arteries has been found associated with disease of the brain, or hemiplegia.

CASE 1.—*Warty growth on the mitral valve; hemiplegia; softening of the brain; fibrinous plug in the middle cerebral artery.*

A female,[2] æt. 51, was admitted on June 25th, 1852, under the care of Mr. Shaw. She had fistula for which she

[1] [Only a few of the following cases are given in detail: the majority have been materially abridged by the author at the request of the Council.—*Sec.*]

[2] Vide 'Med. Times and Gaz.,' vol. v, p. 412; and 'Pathol. Trans.,' vol. iv.

was operated on; four days afterwards she was suddenly seized with syncope and hemiplegia, and died in twenty-four hours.

CASE 2.—*Warty growth on the mitral valve; softening of the brain; fibrinous plug in the middle cerebral artery.*

A man,[1] æt. 42, was admitted June 29th, 1852, under the care of Dr. Crawfurd. The patient had been ill a fortnight, and had the symptoms of softening of the brain. He died four days after admission.

CASE 3.—*Cancer of the penis; hemiplegia; softening of the brain; fibrinous plug in the middle cerebral artery; deposits in the kidney; disease of the valves of the heart.*

James R—, æt. 65, died November 26th, 1853, under the care of Mr. Shaw. The patient had suffered from cancer of the prepuce for six years, and became an inmate of the hospital three months before his death. On November 5th he fell down in the water-closet, apparently fainting, but did not lose consciousness. He recovered from the faintness in half an hour, and was then found to be hemiplegic on the left side. He gradually became worse, and died in a state of imperfect coma on November 26th.

Post-mortem examination made forty-six hours after death.—The central part of the right hemisphere of the brain was found to be much softened, but not altered in colour. The arteries of the brain were all perfectly healthy with the exception of the right middle cerebral. At the point where the artery branches, a fibrinous plug, the size of a grain of wheat, was found firmly adherent to its walls. Attached to the distal side of this plug were two slender strings of fibrin about half an inch in length, these extended into each of the branches of the artery, and did not adhere to the walls of the vessels. In the right kidney was a

[1] Vide 'Med. Times and Gaz.,' vol. v, p 412; and 'Pathol. Trans.,' vol. iv.

bright, yellow, fibrinous deposit; in the left, a cicatrix. The spleen was healthy. The lungs were congested; there was a peculiar cartilaginous growth on the pleural surface of the diaphragm; the mitral valve was thickened; the free edge of the aortic valve much calcified. There were no distinct warty growths on the valves, or on the endocardium.

CASE 4.—*Hemiplegia; softening of the brain; gangrene of the feet and nose; fibrinous deposits in the spleen; vegetations on the mitral valve; plugging of the middle cerebral artery.*

Ann T—,[1] æt. 37, died under the care of Mr. Moore. She had suffered from cancer of the uterus for six months; twenty-two days before her death she became hemiplegic. The gangrene appeared ten days later.

CASE 5.—*Softening of the brain; hæmorrhage; fibrinous plug in the middle cerebral artery; warty growth on the endocardium; fibrinous deposit in the spleen and kidneys.*

Kezia S—, æt. 15 years, was admitted on March 11th, 1858, under the care of Dr. Hawkins. She had been ill a fortnight. She was speechless when admitted, and died four days afterwards.

CASE 6.—*Rheumatic endocarditis; apoplectiform seizure; fibrinous plug in an artery of the brain; extravasation of blood; warty growth on the aortic valve; fibrinous deposit in the spleen and muscular substance of the heart.*

John S—, æt. 27, a bricklayer, was admitted July 14th, 1857, under the care of Dr. Hawkins. The patient had suffered twice formerly from acute rheumatism, and had symptoms of heart disease for twelve months. He was admitted with dropsy. Six days afterwards, he suddenly became insensible, and died on the following day.

[1] Dr. Van der Byl, 'Path. Trans.,' vol. vii.

CASE 7.—*Hemiplegia; softening of the brain; fibrinous obstructions in several of the cerebral arteries; fibrinous deposit in the spleen and kidneys; warty growth on the valves of the heart.*

Frances C—,[1] a female, æt. 44, when in apparent health, fell down hemiplegic. She rallied slightly, but died comatose twenty-one days subsequently.

CASE 8.—*Bronchitis; hemipleyia; fibrinous plug in the middle cerebral artery; deposit in the spleen and kidneys; vegetation on the aortic valves.*

Elizabeth S—, æt. 58, died under the care of Dr. Hawkins, on June 17th, 1858, having been admitted two days previously. She had suffered from cough for a month, and three days before admission she became suddenly insensible and paralysed on the right side. When admitted she was quite insensible, the breathing being almost stertorous; she was hardly able to swallow.

CASE 9.—*Mitral disease; hemiplegia; softening of the brain with slight extravasation on the surface; fibrinous plugs in the middle cerebral artery, and in one of its branches; fibrinous deposit in the spleen and kidneys.*

Eliza S—, æt. 46, was admitted under Dr. Stewart, on September 1st, 1858. A systolic mitral murmur was detected. On the morning of the 28th she suddenly became hemiplegic, her consciousness remaining but the power of speech being lost. She became less sensible, but not comatose, and died on October 30th.

CASE 10.—*Rheumatic endocarditis; hemiplegia; softening of the brain; obstructed middle cerebral artery; warty growths on the endocardium; fibrinous deposits in the spleen and kidneys.*

[1] Dr. Van der Byl, 'Path. Trans.' vol. ix.

Jane C—, a servant, æt. 23, was admitted on November 22nd, 1860, under the care of Dr. Stewart. She had been out of health for six months, and had suffered from rheumatic pains, and from severe cough for some months; and she had suffered from rheumatic fever once, eight years before. On November 13th she lost the use of the left arm and leg. When attacked she became partially comatose, and remained in this condition for four hours. After this she fully regained consciousness, and became somewhat excited, and wandered a good deal. She then became partially comatose, and became subject to convulsive movements which especially affected the eyeballs, and she died November 24th.

CASE 11.—*Rheumatic endocarditis; hemiplegia; softening of the brain; plugging of the middle cerebral artery; fibrinous deposits in the spleen and kidneys; cicatrix in kidney.*

Fanny N—, a married woman, æt. 27, was admitted under the care of Dr. Stewart, on February 12th, 1861. She stated that she had been attacked a fortnight before Christmas with pain and swelling of the feet. At the time of admission she was suffering from pain in various parts, and a loud, rough, whizzing murmur was heard over the body of the heart. For a week after admission the murmur continued to increase in intensity; on the 25th, friction sound was audible, and on the 27th the murmur had become musical.

On the morning of March 7th she awoke in her usual health, and at 9 a.m., as she was being lifted in bed, she fell back in a state of complete insensibility; there was some foaming at the mouth, but no convulsive movements. In the course of the morning consciousness partly returned, her eyes and face drawn to the left; the right arm and leg paralysed. She gradually sank, and died incompletely comatose on the 9th.

GROUP II.

Examples of softening of the brain associated with disease of valves of the heart, but in which the state of cerebral arteries is uncertain.

CASE 12.—*Rheumatism; endocarditis; hemiplegia; softening of the brain and hæmorrhage; fibrinous deposits in the spleen and kidneys.*

Robert T—, æt. 15, a plasterer's boy, was admitted under the care of Mr. Moore, on October 18th, 1855. At the time it was asserted, by those who brought the boy to the hospital, that he had fallen from a scaffold, but this statement was subsequently found to be incorrect. In the previous winter he had been laid up with pains in his joints. After this illness, he did not regain his strength. On the morning of his attack he went to work as usual, but stated that he felt an odd sensation about the mouth. When on the scaffold he became faint, and was carried down by his fellow-workmen. When admitted, he was partly unconscious, but able to give his name; his face was drawn to the right side, and his left arm and leg were powerless. Subsequently the muscles of the paralysed limbs became contracted; he had one slight convulsive seizure, and passed into a state of profound coma, in which state he died on October 23rd.

Post-mortem examination made thirty-eight hours after death.—Over the right lateral ventricle of the brain there was a clot of blood about the size of a hen's egg. Several small clots and patches of "ecchymosed" brain were found near to the larger clot. The structure of the brain around was much softened. In the spleen and in the kidneys there were several fibrinous deposits, and cicatrices of various ages. In the heart, a large and loose warty growth was found attached to the aortic valves. A small aneurism

was also discovered, communicating with the left ventricle and passing into the septum. The cerebral arteries were not examined.

CASE 13.—*Purpura; hemiplegia; softening of the brain and cerebral hæmorrhage; fibrinous deposits in the spleen; cicatrix in the kidney; vegetations on the aortic valves.*

James B—, æt. 23, died November 21st, 1853, under the care of Dr. Hawkins. He had been in the hospital in September, suffering from purpura. He was readmitted on November 8th, having fallen asleep in the middle of the day and having awoke hemiplegic. The amount of paralysis increased, and he died on November 21st, after two violent epileptic fits.

CASE 14.—*Bronchitis; pneumonia; hemiplegia; softening of the brain; fibrinous deposits in the kidneys.*

Caroline H—, æt. 54, was admitted with bronchitis, under the care of Dr. Stewart, January 20th, 1857. On the morning of January 22nd she became faint, partially unconscious and hemiplegic. After this she became loquacious and then semicomatose, with twitching of the muscles, and died on November 25th.

GROUP III.

The two cases which form the next group exhibit what are probably the ultimate results of obstructions in the cerebral arteries when the patient recovers the immediate effects of this lesion. In the great majority of cases death is no doubt the consequence, and this event it will be seen in the foregoing cases rarely takes place sooner than three or four days, and is rarely delayed longer than three weeks. There is, however, no doubt but that recovery does ensue in a certain number of instances, and chiefly in those in which a small artery only has been obstructed. The ap-

pearance presented by the brain structure under these circumstances closely resembles that which is observed in other organs, and a cicatrix corresponding in all particulars to the cicatrices in the spleen and kidney is formed. In neither of the cases which are here brought forward is the proof absolutely conclusive that the cicatrix originates in the way indicated, but in one instance the patient having survived a transient attack of hemiplegia died twelve months afterwards, and presented after death a cicatrix in the cerebellum, and warty growths on the valves of the heart; and in the second case the mode of seizure corresponds to a sudden obstruction of an artery, but unfortunately the post-mortem examination did not extend to the internal organs. In neither case was there any reason to suppose that the cicatrix had originated from any other cause, such as apoplectic cyst, and the position of the cicatrices in these instances renders it very difficult to ascribe the cicatrix to another cause than obstructed artery.

It need hardly be here remarked that little evidence can be derived from a careful examination of the arteries in such cases, as the obstruction must have occurred so long before that the vessel would have become obliterated and absorbed, the collateral arteries having become enlarged and carrying on the circulation.

CASE 15.—*Ovarian tumour; hemiplegia (imperfect) twelve months before death; cicatrix in the cerebellum; cicatrix in the kidney; warty growths on the mitral valve.*

Sarah G—, æt. about 34, died under the care of Mr. De Morgan, on September 28th, 1853. She had suffered from ovarian tumour and dropsy for six years before her death. In 1849 an attempt was made to perform the operation of ovariotomy, but the adhesions being considerable the operation was abandoned; after this she was repeatedly tapped. About twelve months before her death she became partially hemiplegic for a few hours, but at the end of a few days she regained her usual state of health.

Post-mortem examination made twenty-eight hours after death.—The convolutions of the cerebrum presented the appearance of being somewhat atrophied. On the side of the under surface of the cerebellum was a deep excavation large enough to admit the points of three fingers, the brain tissue being shrivelled and its place occupied by œdematous membranes. There were several warty growths on the mitral valve, there was also a cicatrix in one of the kidneys. The only other disease observed was the ovarian tumour.

CASE 16.—*Sudden loss of power over one leg, followed by partial paraplegia; death six years after from laryngitis; cicatrix of the cerebrum.*

A gentleman, æt. 58, died of laryngitis in January, 1857. Six years before his death he suddenly felt as if the left leg had gone through the floor. After a month he recovered some power, but the right leg also became affected. The paraplegia by degrees slowly increased; the sight of the left eye became impaired. At the post-mortem examination a small cicatrix was discovered on the front part of the right half of the cerebrum.

GROUP IV.

The following are the headings of the cases of fibrinous deposits in the internal organs of the body where there was no affection of the brain. With the exception of case 28 it will be seen that they were all associated with disease of the cardiac valves, or coagula in the heart.

CASE 17.—Sarah D—, æt. 47. General dropsy; dilatation and hypertrophy of the heart; warty growth on the aortic valve; fibrinous deposit, and cicatrix in the kidney.

CASE 18.—Louisa M—, æt. 42. Bronchitis, emphysema, cirrhosis of the liver; vegetations on the mitral valve; fibrinous deposit and cicatrices in the kidneys; deposit in the muscular substance of the heart.

CASE 19.—William J—, æt. 23. Hypertrophy of the heart; vegetations on the aortic and mitral valves; numerous fibrinous deposits in spleen; granular disease of the kidneys.

CASE 20.—Thomas H—, æt. 22. Hypertrophy of the heart; adherent coagula in the cavities of the heart; pulmonary apoplexy; cirrhosis of the liver; numerous fibrinous deposits in the kidneys.

CASE 21.—Sarah Q—, æt. 36. Puerperal metritis; vegetations in the heart; fibrinous deposits in the spleen; fibrinous (?) deposits in the lungs.

CASE 22.—Martha J—, æt. 25. Hypertrophy of the heart; vegetations on the mitral valve; loose coagula in the cavities; pulmonary apoplexy; fibrinous deposits and cicatrices in the kidneys.

CASE 23.—Mary P—, æt. 36. Osteoid cancer (myeloid) of the humerus scapula, &c., with similar tumours in the lungs; vegetations on the mitral valve; fibrinous deposit in the spleen.

CASE 24.—Mary C—, æt. 28. Hypertrophy of the heart; vegetations on the mitral and aortic valves; granular disease of kidneys; fibrinous deposit in the spleen, and in the muscular substance of heart.

CASE 25.—James T—, æt. 28. Hypertrophy and dilatation of heart; endocarditis; fibrinous deposit in kidney.

CASE 26.—Eliz. M—, æt. 39. Loose coagula in the heart; plugging of the left common iliac artery; gangrene of the leg; numerous fibrinous deposits and cicatrices in the kidneys and spleen.

CASE 27.—George K—, æt. 25. Hypertrophy of the heart; thickening and adhesion of the aortic valves; hepatization of the lung; cicatrices in the kidneys.

CASE 28.—John C—, æt. 30. Grey hepatization of the lungs; several fibrinous deposits in the spleen; heart and its valves healthy.

SUMMARY.

As regards the complete cases in which there was *softening of the brain, and obstruction in the cerebral arteries* (Group I), it is seen that in nine out of eleven cases fibrinous deposits were found in either spleen or kidney, or in both. In the remaining two cases no such appearance is noticed, but as these were the first cases observed, and the records are not perfect, it cannot be absolutely affirmed that no such deposits existed in the spleen and kidneys of these patients.

In ten out of the eleven cases the middle cerebral or one of its large branches was the artery obstructed, but in three out of these ten cases there was a second obstruction in some other artery of the brain.

In two of the cases there was gangrene of some part of the surface of the body, in one of these instances there were several patches of (local) gangrene, in the other there was but a single patch.

In one instance, in addition to fibrinous deposit in other organs, there was a fibrinous deposit in the walls of the heart.

In ten out of the eleven cases there were warty growths on the valves of the heart, similar in structure to the fibrinous plugs in the cerebral arteries. In the remaining instance no obvious warty growth was found after death, but there was extensive and rough atheromatous and calcareous disease of the aortic valves, and of the aorta.

In the other *three cases* (Group II) in which there was *cerebral disease, but in which the state of the arteries was not ascertained,* it is seen that in two there were vegetations on the valves of the heart; in the third case there was hepatization of the lung. In two of the three cases there

were fibrinous deposits in both the spleen and kidney, and in the third there were deposits only in the kidney.

As regards the cases of *fibrinous deposits without cerebral disease* (Group IV) it is seen that out of the twelve cases observed there were vegetations or loose clots in the heart in nine cases. In one of the remaining instances there was a rough condition of the endocardium, but no distinct vegetation. In the eleventh case the aortic valves were thickened and adherent together, but in this instance there was not a recent fibrinous deposit, but a cicatrix of old date. In the last case the valves and the endocardium were healthy, but the lung was in a state of gray hepatization.

It should also be noted that in two of the cases of this group there were fibrinous deposits in the muscular substance of the heart, and in one there was gangrene of the leg.

As regards the *cerebral symptoms* in the cases of the first two groups: No satisfactory history could be obtained of two of the cases. Out of the remaining twelve cases, in five syncope and coldness of the surface was a prominent symptom.

At the time of attack there was no loss of consciousness in three cases, two were attacked it is supposed during sleep and awoke hemiplegic. In one of these latter cases (9) the exact time of attack is somewhat doubtful, in the other case (13) it seems very probable that the seizure did take place during sleep. In all the remaining nine examples there was more or less complete loss of consciousness, but in none was there profound coma. The duration of the insensibility varied from a few minutes to three or four hours. In one instance the seizure was preceded by intense pain in the head.

When an artery becomes obstructed the effect produced on the part to which that artery should supply blood is very similar in the different regions of the body. For a short time the supply of blood is completely cut off from the part. After an interval, however, the collateral circulation

enlarging, enables the part to receive a scanty supply of nourishment. In certain situations it is well known that there are but few anastomoses of the arteries, and the collateral circulation can only therefore be carried on to a very limited extent. This absence of anastomosing vessels is especially noticed in the cerebral arteries (beyond the circle of Willis) and also in the arteries of the spleen and kidneys. It is in these organs more particularly that the evil effects of obstructed arteries are observed. In other parts of the body the collateral circulation is quickly established, and the condition of the affected part undergoes no material alteration, and it is probably only in those cases in which two or more neighbouring arteries become obstructed that any visible effect is produced, and in these instances the part becomes either gangrenous, or, if the circulation does not entirely fail, it may become the seat of fibrinous deposit; the former is no doubt the condition which existed in the instances of local gangrene (cases 1, 4, 26) and the latter in the examples of fibrous deposit in the walls of the heart (cases 12, 18, 24).

A consideration of the alterations which take place in the circulation of a part, of which the nutrient artery becomes obstructed, will explain the structural changes which are met with. At first, simple local anæmia is produced, and this condition may frequently be observed both in the spleen and kidney. The pale patch corresponds accurately with the area to which the artery should distribute its supply of blood, and the form is, therefore, almost always that of an irregular cone, the apex of which is directed towards the obstructed artery. On microscopical examination, these pale patches do not exhibit any deviation from the normal structure of the part. In the next stage, the vessels of the surrounding parts enlarge in order that they may carry a supply of blood to the affected structures; and as it is more especially by means of the minute vessels that this anastomosis takes place, a bright zone of enlarged vessels forms and encircles the pale patch. During the time that nature is making this effort to reestablish the

circulation the pale patch is in a state of commencing gangrene, but it is saved from absolute death by the feeble and irregular supply of blood which it receives from these surrounding vessels. A low form of inflammation follows, during which compound exudation corpuscles are formed (especially in the instance of the brain), the tissue undergoes rapid degeneration, and fat accumulates both in the cell- and the other structures of the part. During this stage, the bright zone formed by enlarged vessels is still observed, and the patch becomes of a bright yellow colour. The change of colour depends upon the accumulation of fat in the form of granules in the tissue of the part; and it should be observed that the colour does not indicate the presence of fibrine as was formerly supposed. The term fibrinous deposit cannot, therefore, be properly applied to this condition, but it has been made use of in the present communication, as it is the term usually employed, and, although the fallacy has been proved by many observers, no other convenient term has yet been invented by which we can designate these appearances.

In this stage hæmorrhage frequently takes place into the degenerated structure, and this complication was observed in five out of fourteen cases of softening of the brain.

After this, the part recovers to a certain extent its normal condition; the circulation among the degenerated structures becomes more perfect; the bright zone of increased vascularity by degrees disappears. The exudations take on more of the plastic character and undergo contraction, the yellow colour gradually fades, and at length a cicatrix is the result. In the instance of the spleen, kidney, or muscular tissue, this cicatrix is clearly formed of an imperfect fibroid tissue, but in the brain there is yet no positive evidence of the formation of this tissue among the brain structure as a result of obstruction in the arteries.

It will be well, in conclusion, shortly to review the various arguments both for and against the theory which supposes that these obstructions have been washed away from the cavities of the heart by the current of the blood. It will

hardly be necessary here to notice the hypothesis which has been adduced by some, namely, that the fibrinous plugs in the cerebral arteries are the effect and not the cause of the softening of the brain. The want of evidence to prove that a similar condition is observed in other parts of the body, and the fact that the obstruction is formed of fibrinous material and not of simple blood clot, are in themselves reasons for doubting the correctness of such an hypothesis. Moreover, the plug is not usually met with in the small arteries of the part affected, but in one of the arterial trunks; the obstruction is therefore at a distance from the softened portion of brain.

Supposing, then, it to be granted that the obstructed artery is the cause and not the effect of the disease in the brain, the plug may have been formed in the situation in which it is found after death, or it may have been washed from a distance. Both of these hypotheses may be maintained; and there appears to be but little doubt that obstructions in the arteries may originate in either way, and it is therefore necessary to distinguish between the appearances presented by plugs formed in each mode.

One chief difficulty which has presented itself in assigning a distant cause to these plugs is the fact that certain cases have been met with in which no vegetations or emboli have been discovered in the heart. In several of these apparently exceptional cases an inflamed lung was noted, and the presence of this lesion satisfactorily accounts for the occurrence of loose masses of fibrin in the blood. In this manner all the cases of obstructed arteries which have fallen under my own observation are accounted for, there having been noticed in each instance either vegetations, loose clots, or some obvious cause in the heart, or an inflamed lung.

There remain, however, certain cases recorded elsewhere in which no such cause can be traced, and the majority if not the whole of these cases are to be regarded as examples of local arteritis. It will at once be seen that however much the causes of these obstructions in arteries

may differ, the effect produced on the part supplied by these arteries must be precisely similar.[1]

It is, therefore, necessary to distinguish between the appearances presented by an artery filled with fibrinous matter from arteritis, and a plug washed from the heart or elsewhere; and practically there is, I believe, little or no difficulty in drawing this distinction. In the first place it should be observed there is structurally the greatest similarity between the fibrin which forms on the valves of the heart, and that produced by arteritis. I have carefully examined in several of the foregoing cases both the plugs found in the arteries and the fibrin on the endocardium, and have been unable to discover either by the naked eye or by the microscope, any essential difference between them. Moreover, occasionally, we meet with striking features of analogous structure, which appear conclusively to prove that the plugs have been washed from the heart, as, for instance, in Case 6, in which both the plug in the artery and the warty growths on the endocardium, were gritty owing to their having undergone partial calcification; and it should also be observed that in this instance the artery was free from atheromatous or calcareous disease. Except in such an instance as this, the argument derived from identical structure is, however, not of any great weight; for we should hardly expect to find any essential difference in the histological characters of fibrin produced in the interior of an inflamed artery from that presented by the material which forms vegetations on the valves of the heart.

The condition of the plugs found in the arteries depends upon the length of time they have rested in their present site; and as they usually give rise to inflammation, the opportunity frequently occurs of comparing the appearances of a plug thrust into an artery with that produced by local

[1] An excellent example of this statement was observed in a case of general arteritis, recorded by Dr. Van der Byl in 'Path. Trans.,' vol. ix. In this instance there were fibrinous deposits in the spleen, kidneys, in the muscular substance of the heart, and also softening of the brain.

arteritis. If it happens that the patient dies quickly after the attack, the plug is found loose and non-adherent to the wall of the artery; if, however, death does not ensue so rapidly, the plug is generally found to be slightly adherent to the artery. In several instances, the amount of inflammation produced by the presence of the plug has been so great as to cause the effusion of lymph around the artery at the seat of the obstruction.

A very forcible reason for attributing a distant cause to these plugs is the fact that frequently several arteries become blocked up, the plugs usually being met with at points of bifurcation. In all these instances the part of the artery intervening between the plugs was perfectly healthy, and exhibited no evidence of inflammation. Virchow has supposed that these secondary plugs are produced by fragments of a large plug washed away, but it is more probable that the smaller artery became obstructed first, and then the larger. If the larger artery were the first blocked up the circulation in the branches would of course be arrested, and therefore there would be no force to wash a fragment into one of its branches.

The fact that plugs are almost invariably formed at those points where an artery divides and suddenly becomes smaller, tends strongly to prove that the obstruction has originated from the arrest of a solid body suspended in the blood.

It has been urged by Dr. George Johnson [1] that in the instance of the so-termed fibrinous deposits in the kidney there is evidence to show that the obstruction takes place in the inter-tubular capillaries, and not in a branch of the renal artery. There is, however, certainly, strong reason for doubting the correctness of the inferences from these observations, in the fact that fibrinous deposit associated with arteritis of the renal artery [2] precisely corresponds in all particulars with fibrinous deposit associated with vegetations on the endocardium; whilst, on the other hand, the

[1] "On the Minute Anatomy of the so-called Fibrinous Deposits in the Kidneys," by Dr. G. Johnson, 'Path. Trans.,' vol. ix.

[2] "A case of Arteritis," Dr. Van der Byl, 'Path. Trans.,' vol. ix.

appearance presented by a kidney affected with inflammation of the renal vein[1] is altogether of a different nature.

As an additional reason for believing that portions of vegetations may be washed away from the valves of the heart, those cases might be adduced in which large emboli have obstructed one or more of the great arteries of the body, as in Case 26. In these instances the emboli in the artery, corresponding in every particular to the loose clots found in the hearts of the same patients, leave no doubt as to the origin of the bodies in the arteries. If, then, it is allowed that these bodies may be carried to a distance by the circulating blood, it can scarcely be denied that small and loose vegetations from the valves of the heart may be carried in like manner.

The common origin of these obstructions is also supported by the almost invariable association of fibrinous deposits in the spleen and kidney with these instances of softening of the brain. Such a constant companionship can hardly be the result of accidental causes, and it is difficult to imagine that local arteritis can occur in so many and such distant parts of the body, whilst all the remaining portions of the arterial system remain free from disease.

If any additional testimony were required to establish the fact of the washing away of these bodies from the heart, it would be found in a consideration of the symptoms of this form of brain disease. The sudden seizure, the faintness, and the rapid development of the ordinary symptoms of softening of the brain, are all explained on the supposition that a large artery of the brain has suddenly become obstructed, whilst they do not meet with solution on the hypothesis that the obstruction has taken place in the more gradual mode, which would probably have been the case had the artery been obstructed from inflammation of its coats.

I have to express my great obligations to the physicians

[1] "A Case of Extensive General Phlebitis," by the author, 'Path. Trans.,' vol. ix.

and surgeons (both past and present) of the Middlesex Hospital, for their extreme kindness and liberality on all occasions, in affording me every facility for observing the patients under their care, and for placing at my disposal their notes of the cases.

CASE

OF

IRIDEREMIA TOTALIS.

BY

EDWARD CHARLES HULME, F.R.C.S.,
SURGEON TO THE CENTRAL LONDON OPHTHALMIC HOSPITAL.

Received June 21st.—Read June 25th, 1861.

Ion T—, æt. 22, was brought to the Central London Ophthalmic Hospital, on May 31st, 1861, by his wife, who was herself attending as an out-patient for an attack of catarrhal ophthalmia, and who, conceiving there was something peculiar with her husband's sight, wished for my opinion.

On examining the eyeballs, both of them appeared unsteady, rather than oscillating, and there were deep-seated opacities of the lenses; but what was more particularly remarkable, was the absence of the irides of both eyes, and this observation was confirmed by examination, first, with a lens, and then with the ophthalmoscope.

The corneæ were both clear, and of normal size and shape. The scleroticæ both white and healthy; palpation normal; not a vestige of iris was to be seen in either eye, the corneal junction with the sclerotic forming a complete, well-defined ring; the shaded edges of both lenses were clearly to be traced, leaving a narrow ring of the red, illuminated fundus all round; both lenses had capsular opacities, chiefly on their posterior surfaces, the opacities occupying the marginal portions of the lenses. Small, central opacities were, however, to be distinguished on the anterior surfaces, leaving

spaces of perfectly clear lens between the opaque parts. No particular tendency to inversion was observed; the fundi and optic discs of both eyes, of which glimpses only could be obtained, were apparently healthy. There was no drooping of the upper lids, neither was there any intolerance of light; a slight inclination to corrugation of the eyebrows was observable. The sight of both eyes, notwithstanding these imperfections, was so good that he could see to read bourgeois type (No. 6 of Jæger's scales) clearly at about six inches' distance. He says that his eyes oscillated ever since his birth; he sees large objects at a distance more clearly than anything. His power of accommodation is good. His defining powers are not, in any material degree, improved by looking through an artificial diaphragm, as a pinhole in a card, or by convex glasses. His occupation has been for many years that of a sailor, and he took his duty of steering at the wheel regularly, both by day and night, distinguishing the points of the compass. He is now a fireman on the Great Northern Railway. There is no imperfection in any of his children or in any of his family. His sight does not get worse. He has had no advice for his state. Some years ago he saw Mr. Scott at Moorfields.

Complete absence of both irides is very rare. In some cases of irideremia traces of the iris may be discovered. Such a case is reported by Mr. Dixon,[1] a brown line on the upper and inner margin of the left cornea indicating a rudiment of the iris. This patient was suffering from chronic keratitis. There had been no oscillation or unsteadiness of the globes.

Mr. France[2] narrates a case in a woman twenty-three years old. The patient could neither see to read nor write. The globes oscillated. Mr. Lawrence had seen two infants, a few months old, with this congenital deformity. They both appeared to be blind.

Mr. Middlemore[3] also gives the cases of two children in

[1] 'Ophthalmic Hospital Reports,' vol. i, p. 157.

[2] 'Guy's Hospital Reports' for 1842, vol. vii, p. 279.

[3] 'Treatise on the Eye,' vol. i, p. 761.

whom both irides were absent and the globes oscillating. The patients were blind. No amount of light seemed to excite the retina.

M. Sichel[1] denies the occurrence of irideremia, and describes such cases as "congenital mydriasis," in which there is an iris, but retracted to such a degree as to be with difficulty recognisable.

Desmarres considers that one eye only is usually affected.

Von Ammon[2] states that both eyes are usually affected, and rarely one alone. He gives an illustration of this condition.

In most cases of irideremia the lenses or their capsules are more or less opaque. Oscillation of the eyeballs is not, however, always associated with this condition. It is therefore somewhat interesting to find vision comparatively perfect with such combined defects as those narrated in the foregoing case.

[1] 'Iconographie Ophthalmologique,' p. 742.

[2] 'Klinische Darstellungen des Angeborenen Krankheiten des Auges,' p. 50, pl. xii.

DESCRIPTION OF PLATE X.

1. Appearance of one of Ion T—'s eyes, magnified.
2. Ophthalmoscopic appearance.

R. Schweitzer del. G.H. Ford dir.

W. West chr. imp.

A CASE

OF

TETANUS

OF NEARLY

FOURTEEN MONTHS' DURATION.

BY

DANIEL MEADOWS, M.R.C.S., Lowestoft.

COMMUNICATED BY

W. WOODHAM WEBB, M.D., M.R.C.P.L.

Received June 25th.—Read June 25th, 1861.

William L—, æt. 36, a strong fisherman, but with hereditary hæmorrhagic tendency, was attacked in the autumn of 1859 with violent spasms of the muscles of the neck. About two months before the symptoms began, he had been kicked on the back of the neck during a quarrel. No permanent trace of that or of any other injury remained visible. He was then troubled with a violent paroxysmal cough. Early in the month of December one of the paroxysms ceased suddenly, and at the same time the head was thrown backwards with a repeated spasmodic contraction of the muscles, and great pain in the hinder part of the neck. From this time the cough disappeared, but the spasmodic action of the muscles gradually extended over the back and arms.

The attacks of spasm were intermittent, with at most an

interval of half an hour between them day or night. They awoke him from sleep, and prevented his ever obtaining any continuous repose. They sometimes commenced with a slight dry cough, which served as a warning to his friends to attend upon him. His head was then suddenly drawn backward and to the left, with a repeated jerking motion, and the arms were moved with a twitching, or a more violent spasmodic, action. His whole features were dragged backwards, his eyes fixed, the lids being widely open, and his teeth clenched. He seemed to breathe with difficulty, and referred the hindrance to his respiration to the top of his sternum. A little froth sometimes collected on his lips, and he moaned as from pain. He never lost consciousness during these attacks. After the symptoms had continued for some time, their violence lessened, the muscles slowly relaxed, the muscular pain subsided, but a "dreadful" occipital headache sometimes continued for a minute or two. In the intervals he was quite at ease, but always in a perspiration, and always careful of any considerable effort, which appeared to him to bring on the attacks. Thus, he did not walk alone. He could masticate and swallow readily. He spoke of "music in his ears," but had no flashes of light in his eyes. He did not lose intelligence, or present any other symptom of disease of the cerebrum. He had no hiccup.

For many weeks the power of walking was retained, with assistance in steadying the head and neck, but as the spasm became more violent and general, the man was obliged to take to his bed. There he remained for two or three months, without much variation in the ordinary symptoms of opisthotonos. The curvature of the back was extreme, and while the spasm of the muscles of the neck and arms was interrupted and jerking, that of the muscles of the back was continuous during the whole period of each attack. Then there came on an utter impossibility to keep on his back, and, being in great dread of the recumbent posture occasioning or increasing the violence of the spasms, he continued for five weeks kneeling by the side

of the bed, and resting his head and shoulders upon it. Again he was obliged to lie in bed. Almost incessant jactitation of the limbs, sometimes all together, sometimes of the arms and legs by turns, was now added to the ordinary tetanic symptoms, and this was generally made more furious and irregular by the first few inspirations of chloroform. In this state, with frequent change of the chief seat of spasmodic action, and with such occasional intermission of the violence of the symptoms as almost to induce a hope of recovery, the year 1860 passed away. Eating and drinking, especially meat, porter, and wine, with which he was liberally supplied, always kept him quiet for a time, and fortunately his appetite seldom failed. Grasping the rail at the head of the bed, raising or briskly rubbing his arms, would also sometimes ward off the spasm for a while. Mastication had the same effect, and he constantly kept a piece of wood between his teeth, as biting it relieved the spasm.

Early in January, 1861, however, he found that he was gradually becoming less able to maintain any control over himself by these means, and that the remedies in constant use were losing their effect. About the 10th of that month he presented all the symptoms of the most severe form of opisthotonos, and on the 16th, without emaciation, and without paralysis, he died during a paroxysm.

Every kind of treatment was tried in turn. The first, after moderate purgation, was that by aconite. The full effect of this drug was soon produced; but as the pulse fell, the symptoms became worse. Chloroform was then used, and for a long time with relief for hours after the inhalation of one or two drachms. So long as the drowsiness continued, he remained free from an attack, but he was usually aroused by a spasm of more than average severity. Ether had a similar, but not so marked, an influence. Active clearance of the bowels with turpentine and castor oil was followed by a few days of ease. No suggestion of a remedial measure was neglected, and it would be useless to go beyond the mere enumeration of galvanism, counter-irritation, narcotics, stimulants, and antispasmodics of all kinds of repute.

It was, however, found that nothing held the disease in check so well as chloroform, till, at length, upon its occasional failure, and the bad effects of sedatives given by the mouth becoming evident in the loss of appetite and increased irritability, hypodermic injection of morphia was had recourse to, two or three times daily. This for a little while acted like a charm, and the man regained strength and flesh. At last, however, more than fifteen grains of morphia and several ounces of chloroform, used daily, only gave short intervals of quiet. During the week preceding the man's death it was found necessary to let him inhale chloroform almost incessantly, and more than a pint disappeared every twelve hours.

The head and upper part of the cord only were examined. The blood was fluid. The brain was small, firm, and injected, but not diseased. There were several spots of effused blood on the cord, and a flattened clot, not recent, about the size of a sixpence, was found on the front of its cervical portion, opposite the body of the fifth vertebra.

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